

Figure 1

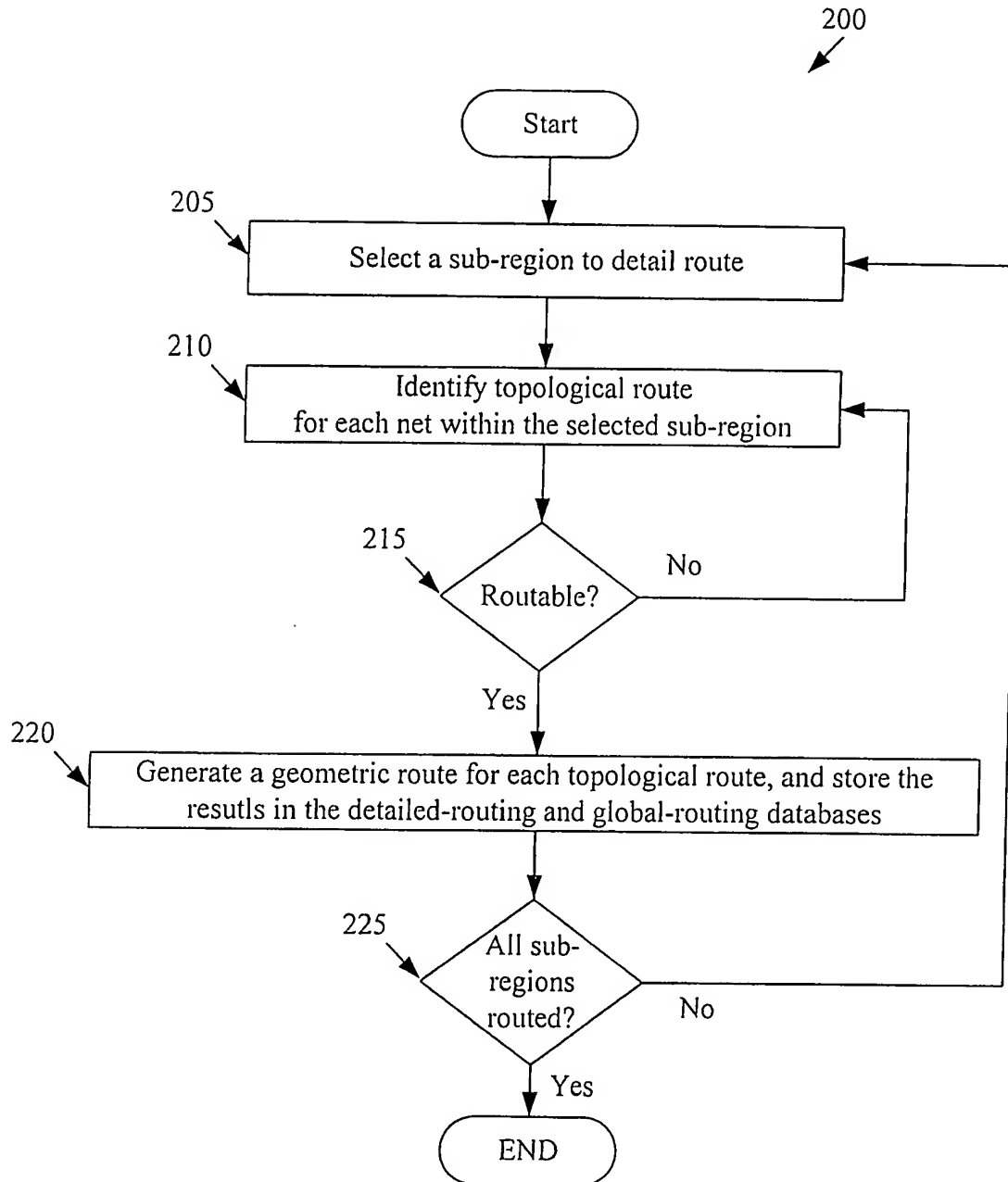


Figure 2

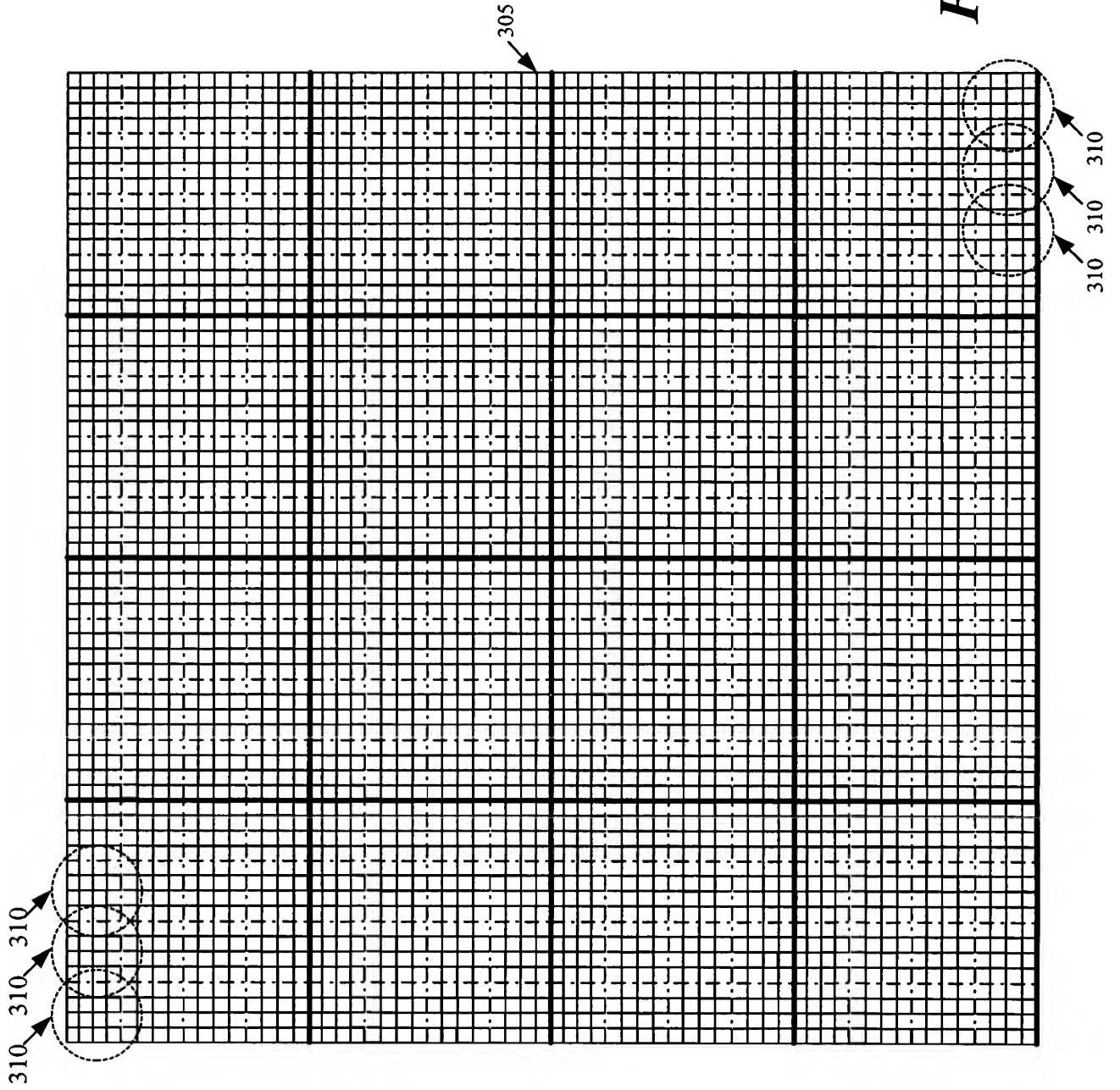


Figure 3

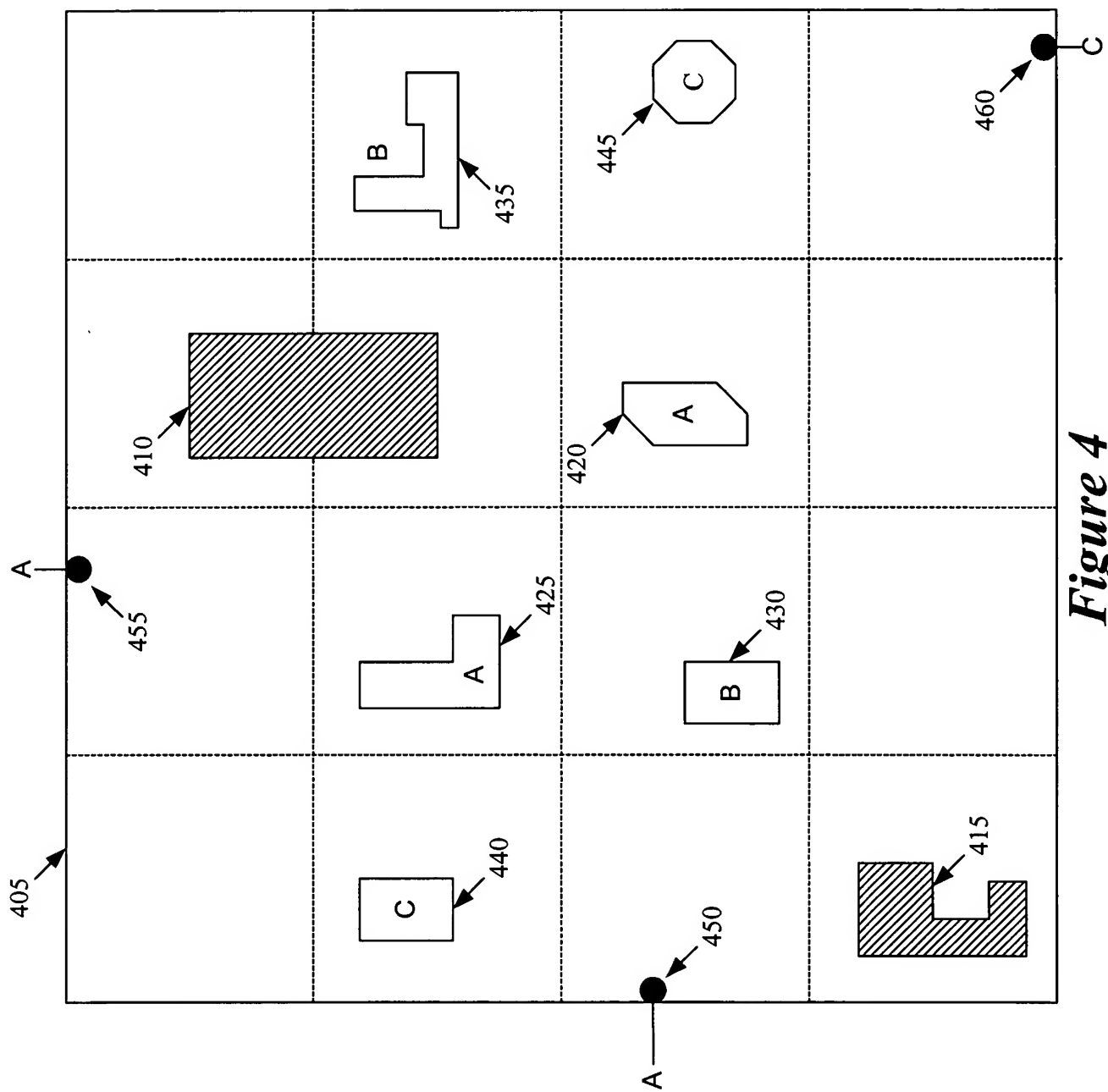


Figure 4

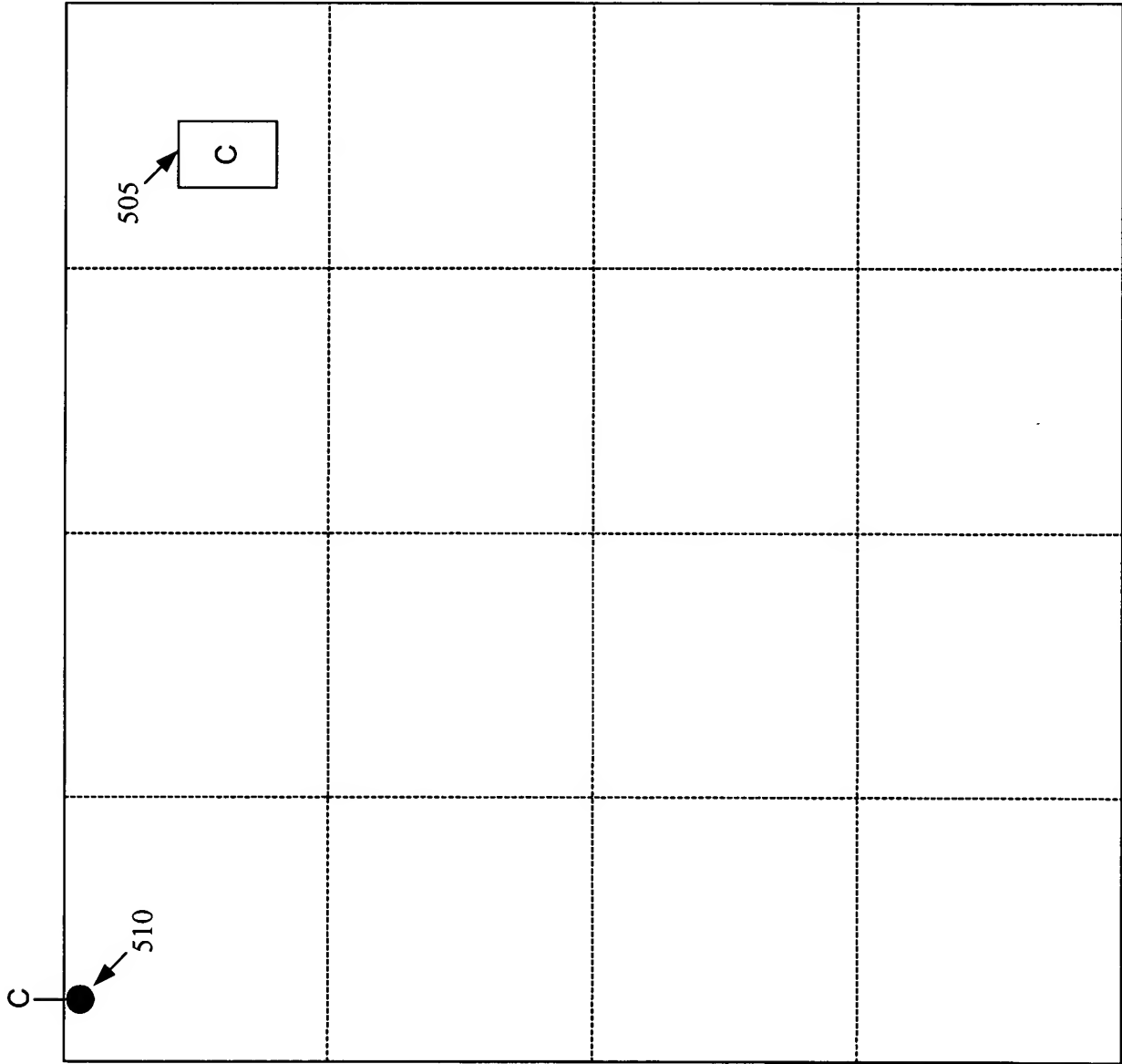


Figure 5

Figure 6

```
-List of Geometries
--Each Geometry including a sequence of points & layer assignment
-Bounding box of the region
-Array of layer properties
--Minimum wire size
--Minimum spacing
--Via sizes
--Cost/Unit
-Netlist specifying a number of nets
--Each net specifying a set of pins
--Each pin specifying a set of ports
--Each port specifying a set of geometries
```

Figure 7

```
-List of Geometries
--Each Geometry including a sequence of points & layer assignment
--List of connection nodes inside each pin geometry
-Bounding box of the region
-Array of layer properties
--Minimum wire size
--Minimum spacing
--Via sizes
--Cost/Unit
-Netlist specifying a number of nets
--Each net specifying a set of pins
--Each pin specifying a set of ports
--Each port specifying a set of geometries
-For each layer, a graph specifying
--Nodes
--Edges
--Faces
```

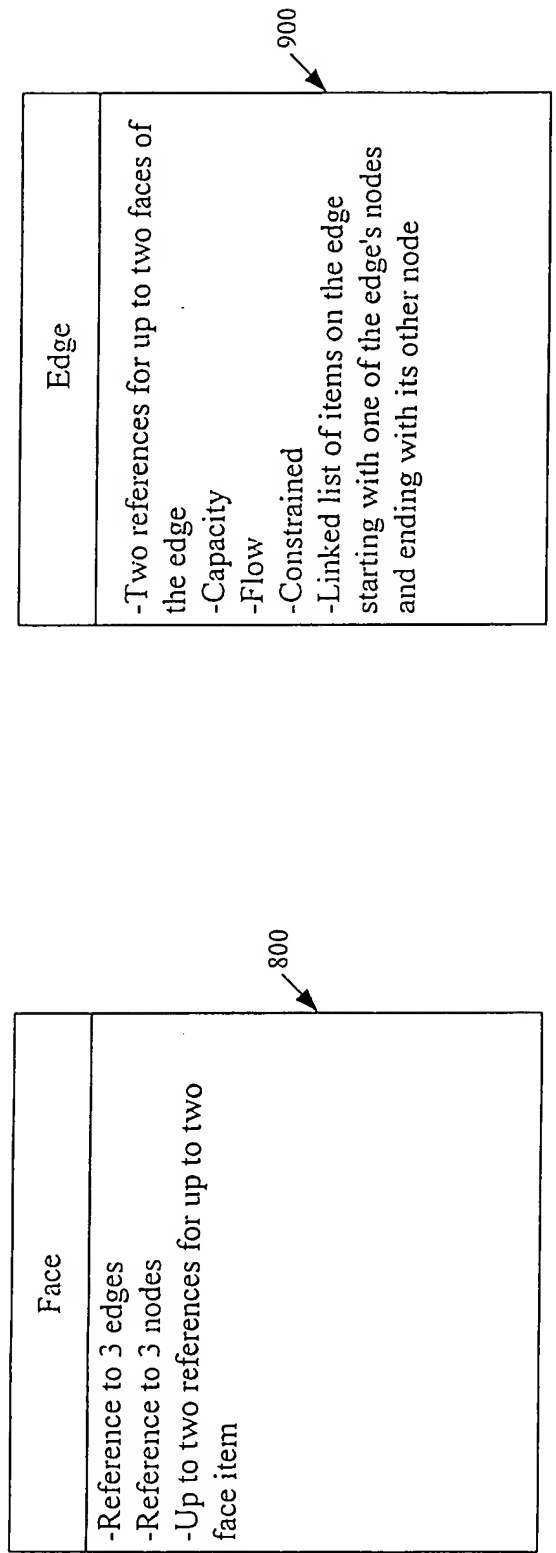


Figure 8

Figure 9

Node
<ul style="list-style-type: none"> -Net Identifier -One or more planar-path references to adjacent topological items in the same planar path -A pair of via-path references to up and down topological via items -A references to list of edges connected to the node -For each edge, an edge reference to the next or previous topological item on the edge -A reference to the geometry of the node -Vertex number identifying the vertex of the geometry -Location of the node

1000

Figure 10

Edge Item
<ul style="list-style-type: none"> -Reference to its edge -Net Identifier -A pair of planar-path references to adjacent topological items in the same planar path -A pair of edge references to the next and previous topological item on the edge

1100

Face Item
<ul style="list-style-type: none"> -Reference to its face -Net Identifier -Up to 3 planar-path references for adjacent topological items in the same planar path -A pair of via-path references for up and down topological via items -Bounding polygon that defines legal face item locations -Constraining Points and Distances

1200

Figure 11

Figure 12

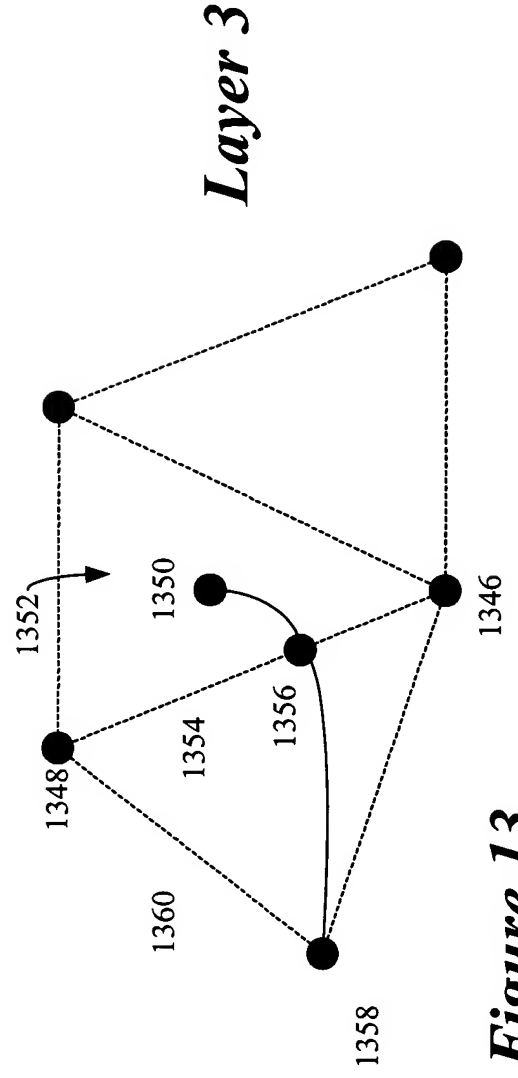
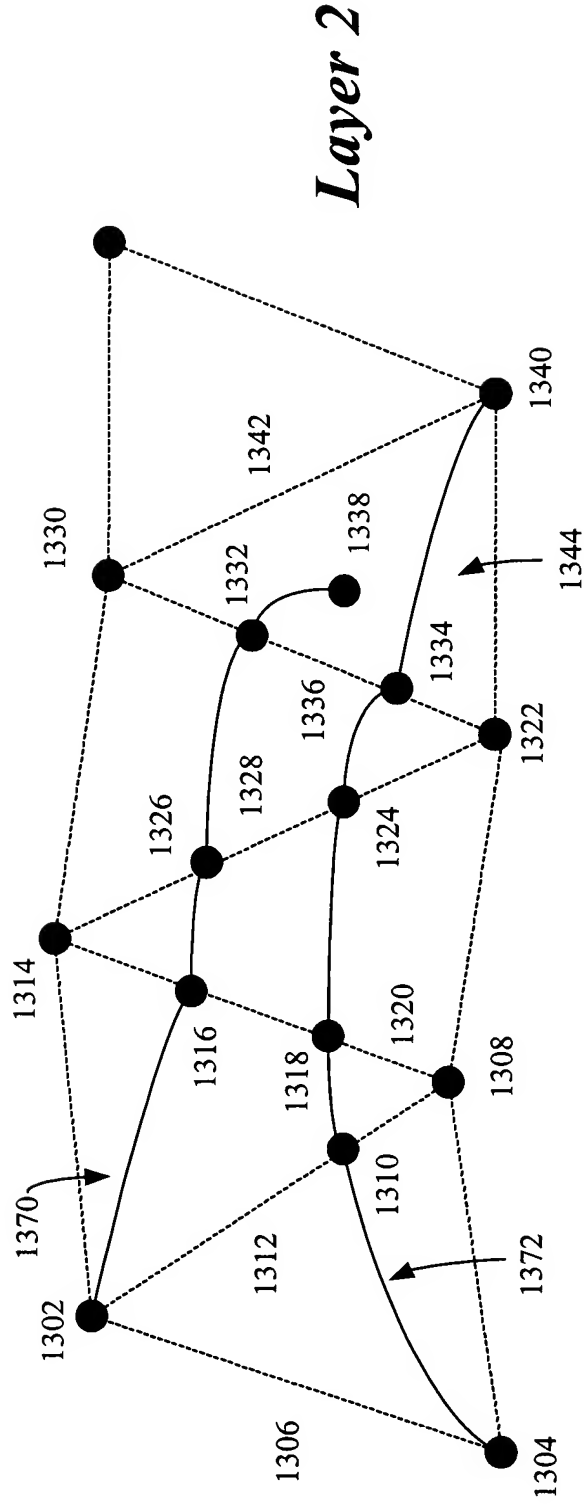
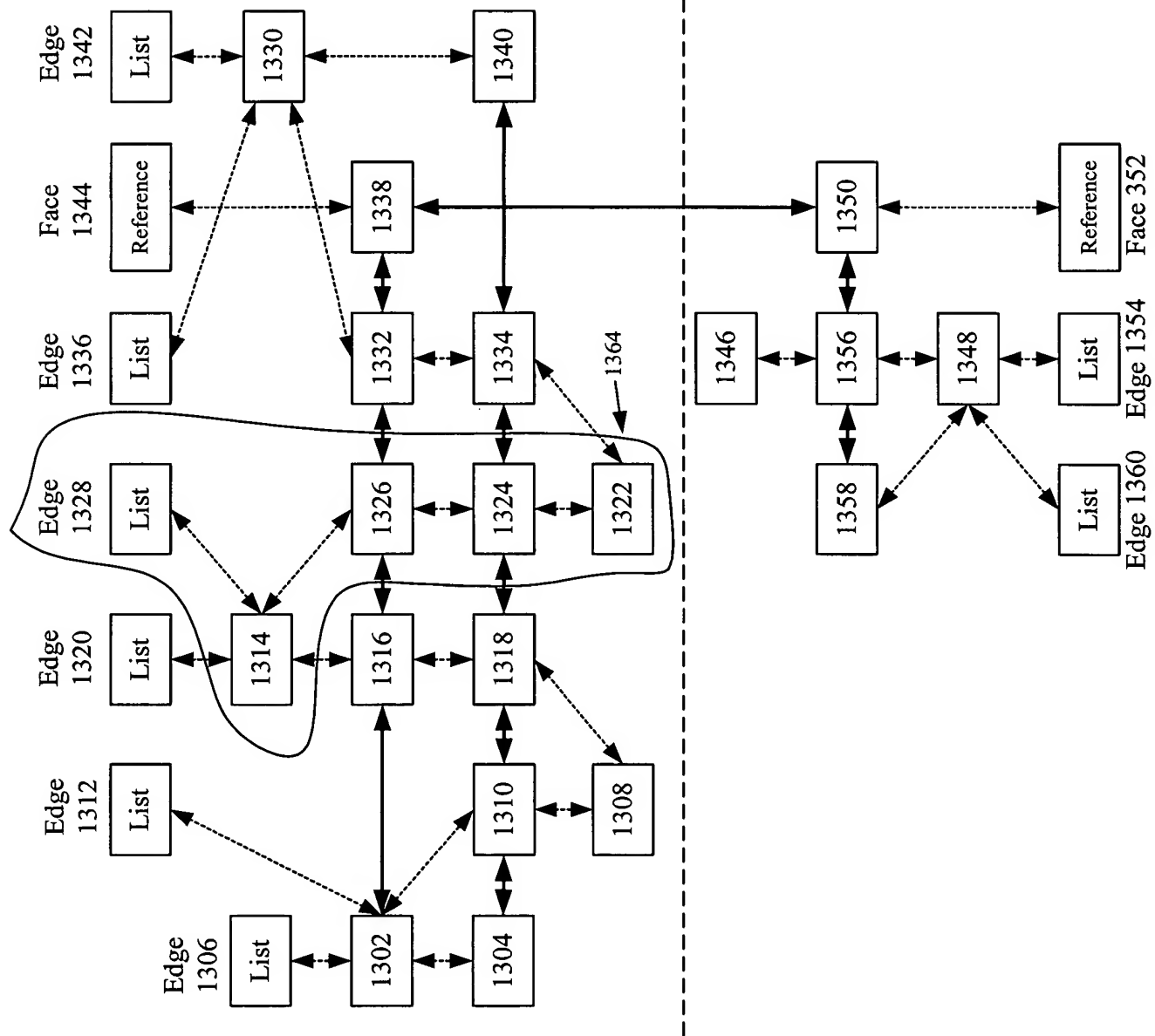


Figure 13



Layer 2

Layer 3

Figure 14

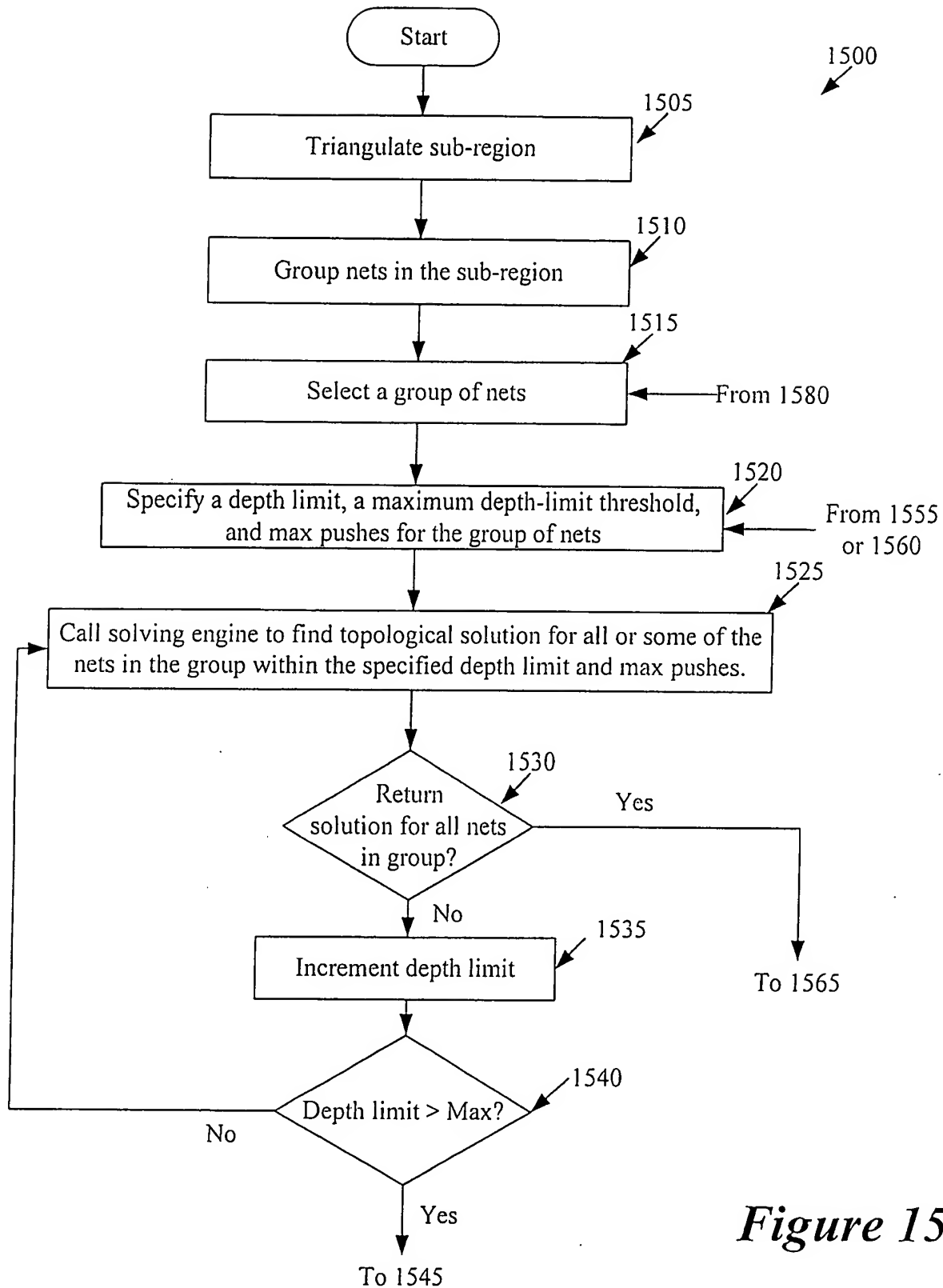
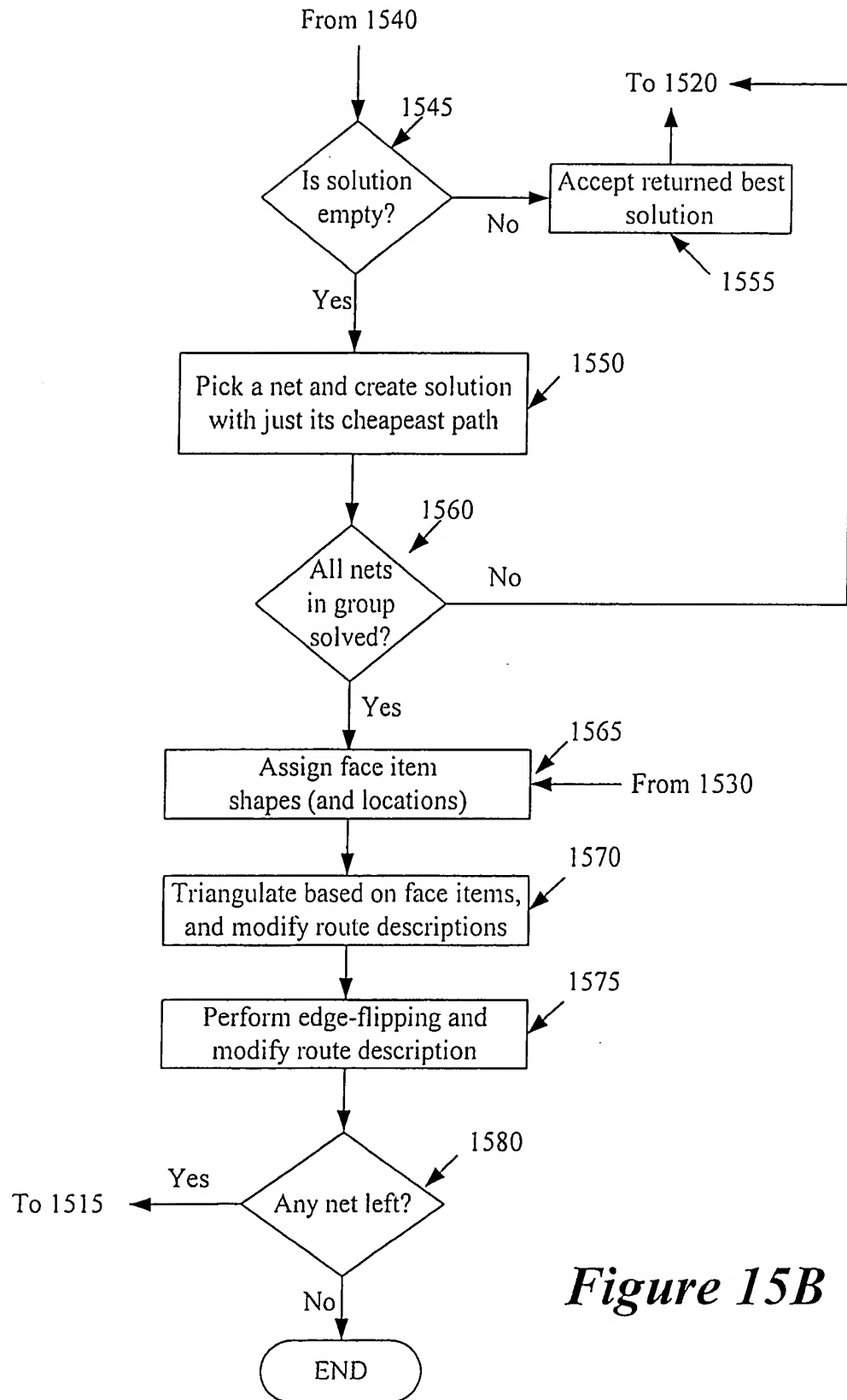
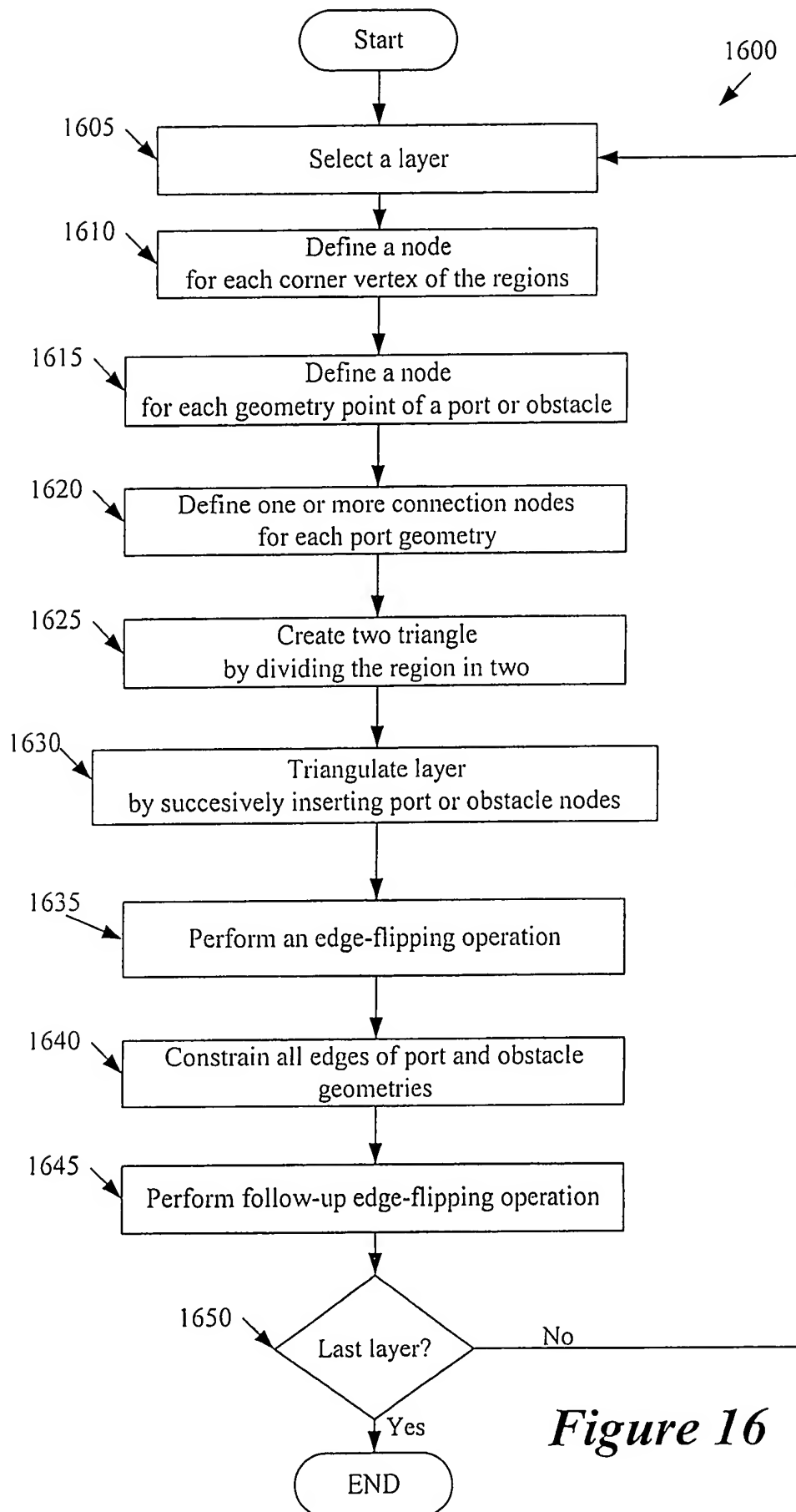


Figure 15A

*Figure 15: Figure 15A
Figure 15B*

*Figure 15B*

*Figure 16*

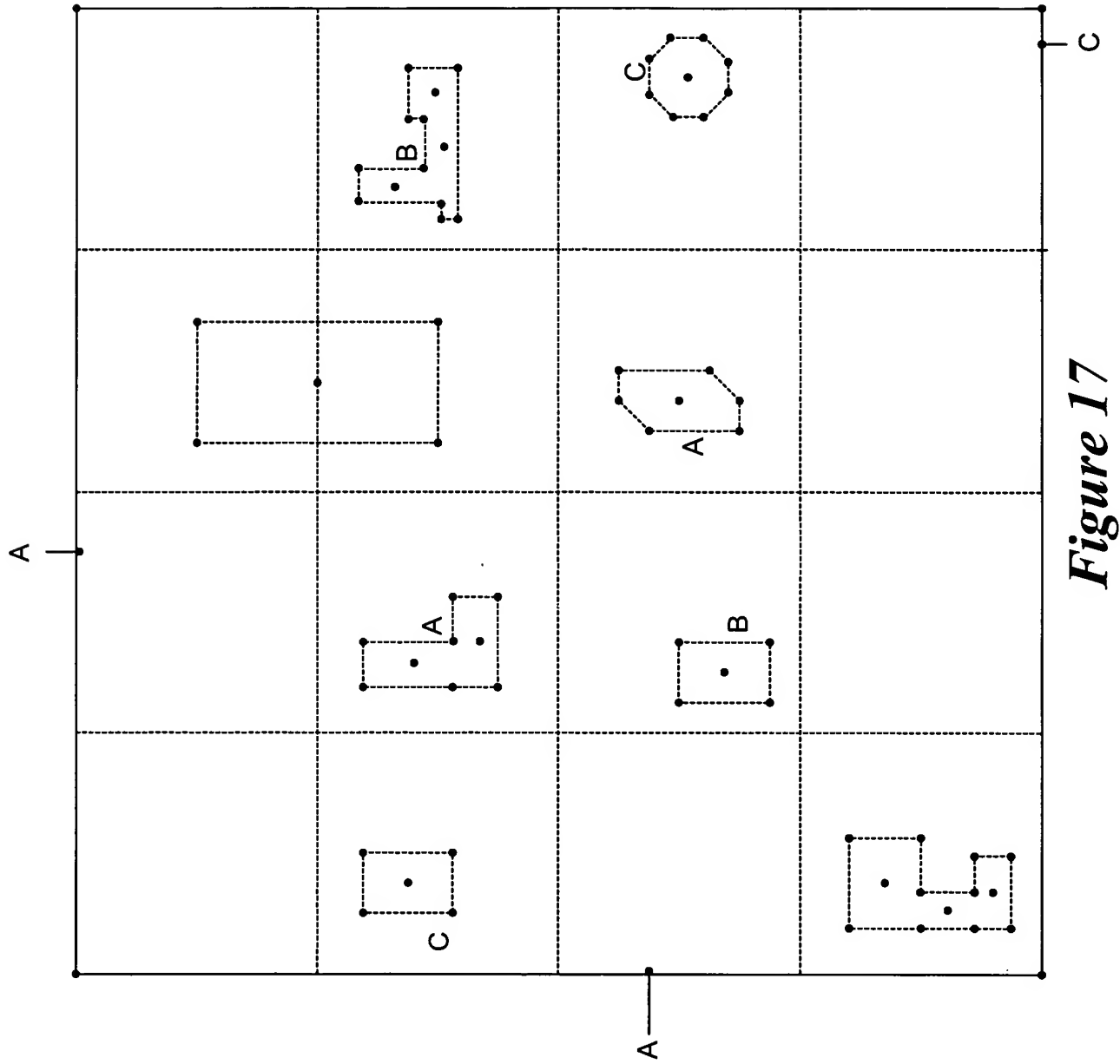


Figure 17

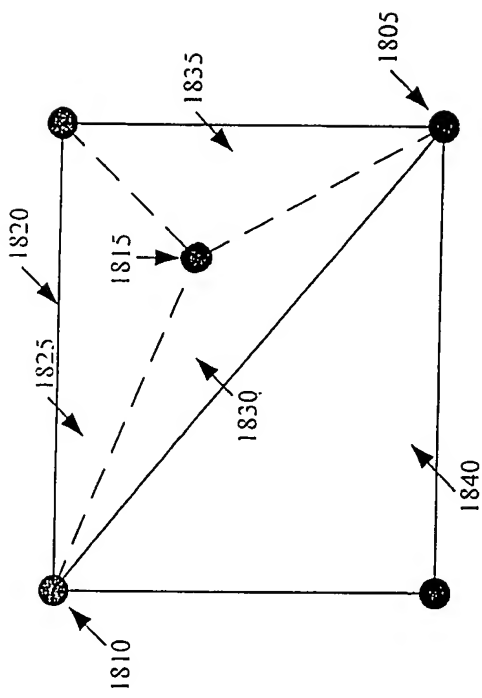


Figure 18

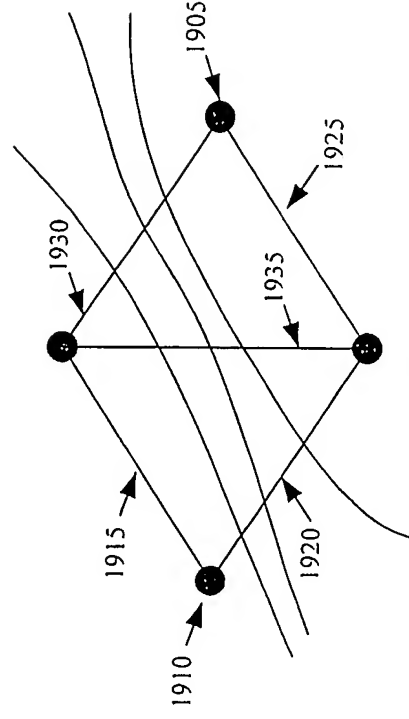


Figure 19

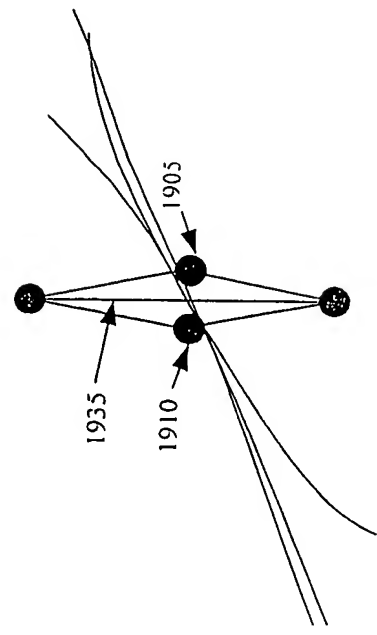


Figure 20

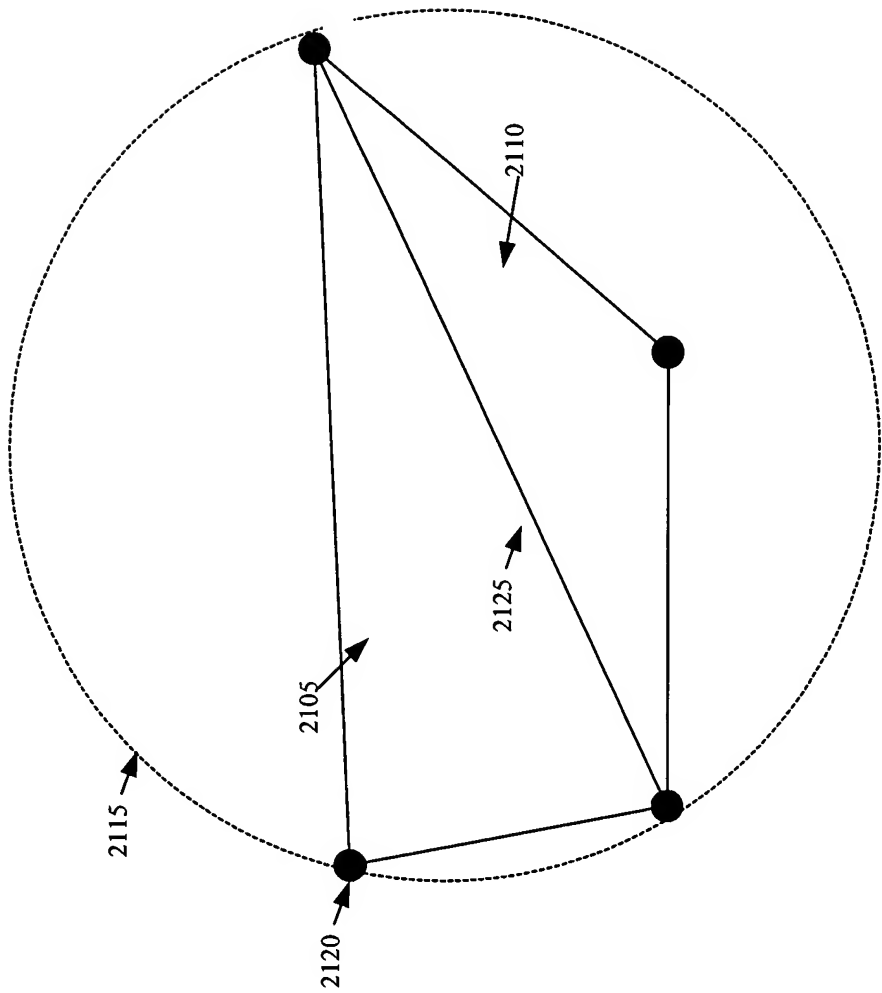


Figure 21

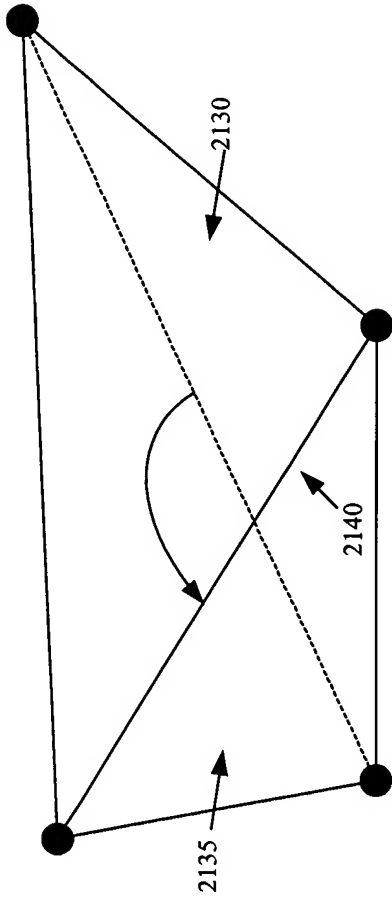


Figure 22

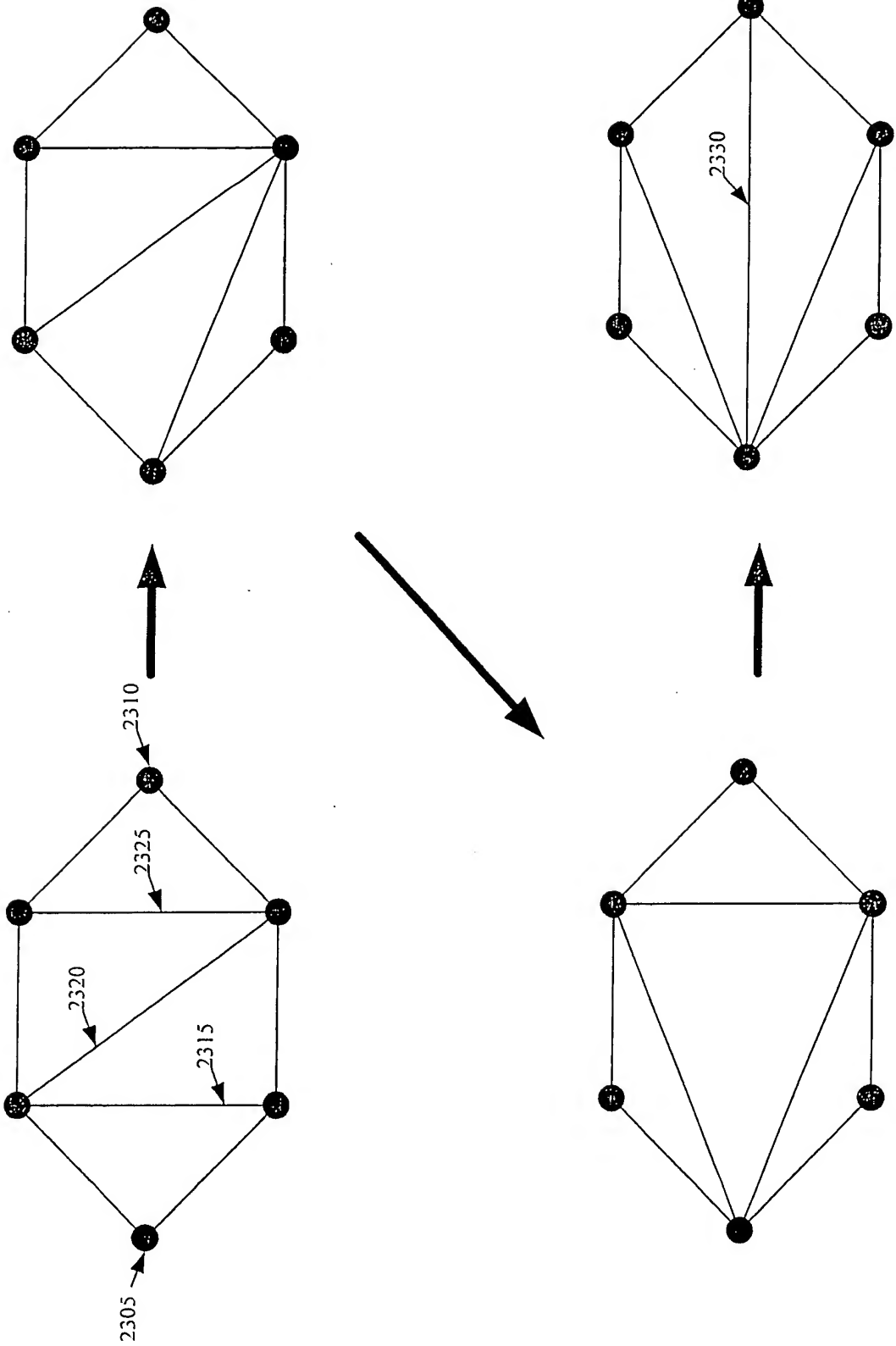
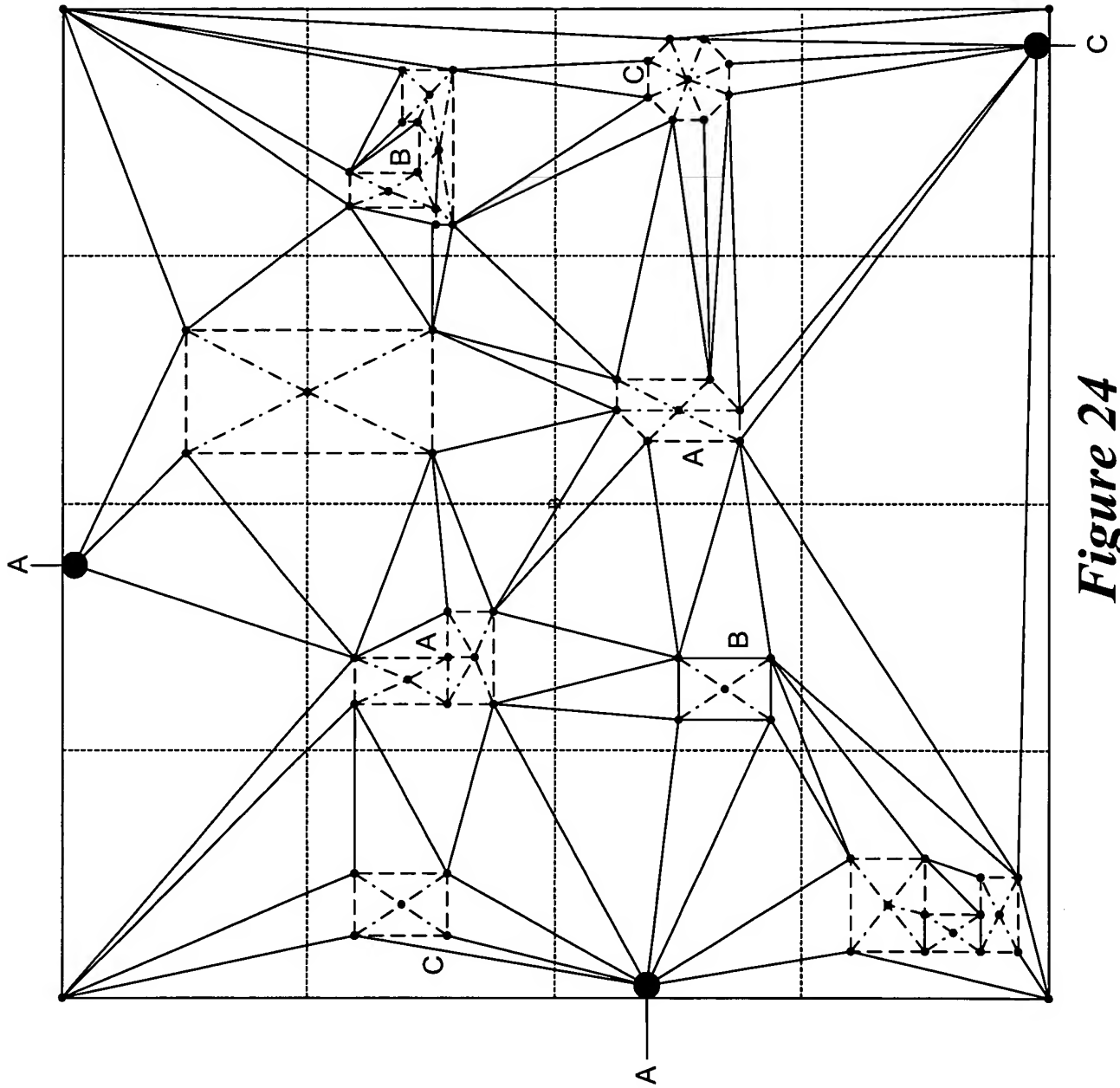


Figure 23

*Figure 24*

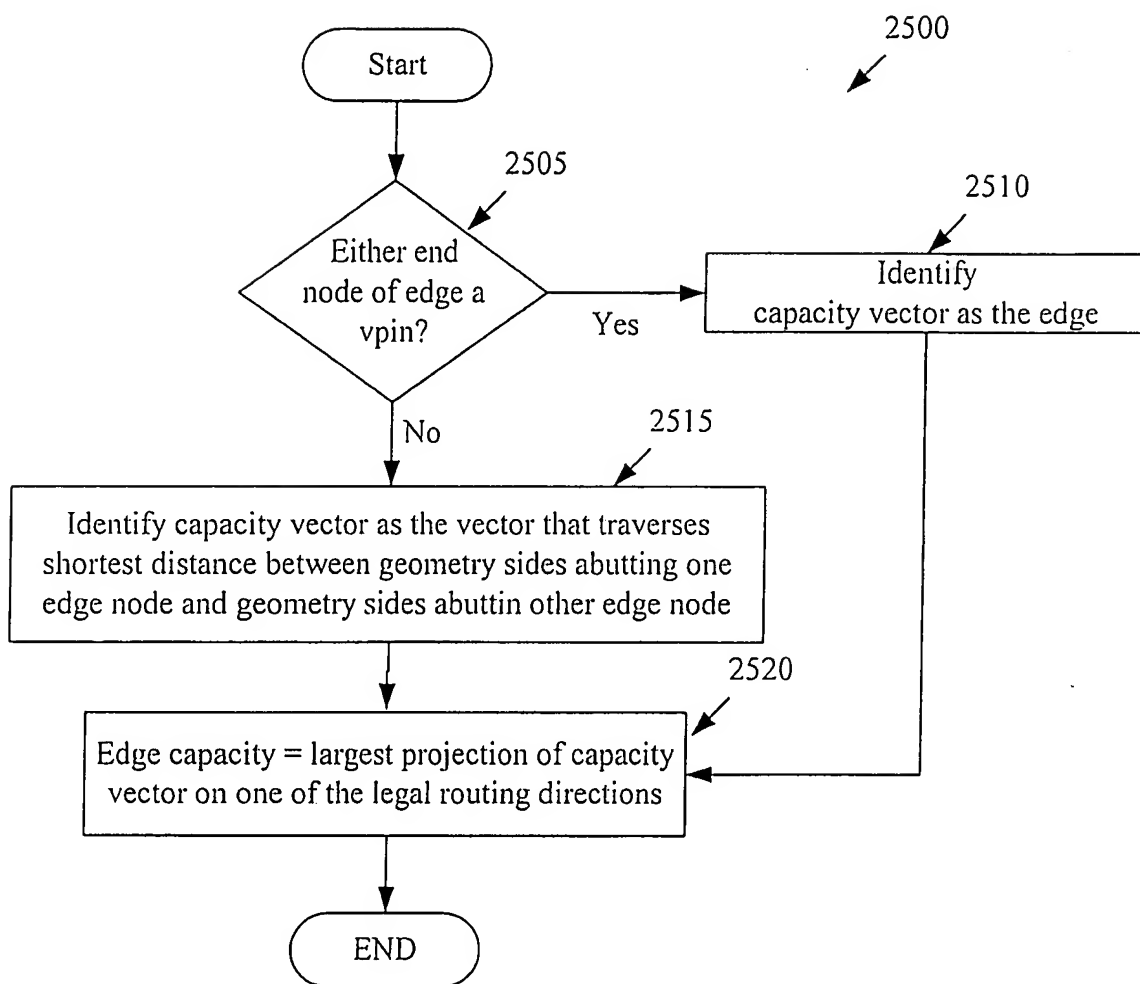


Figure 25

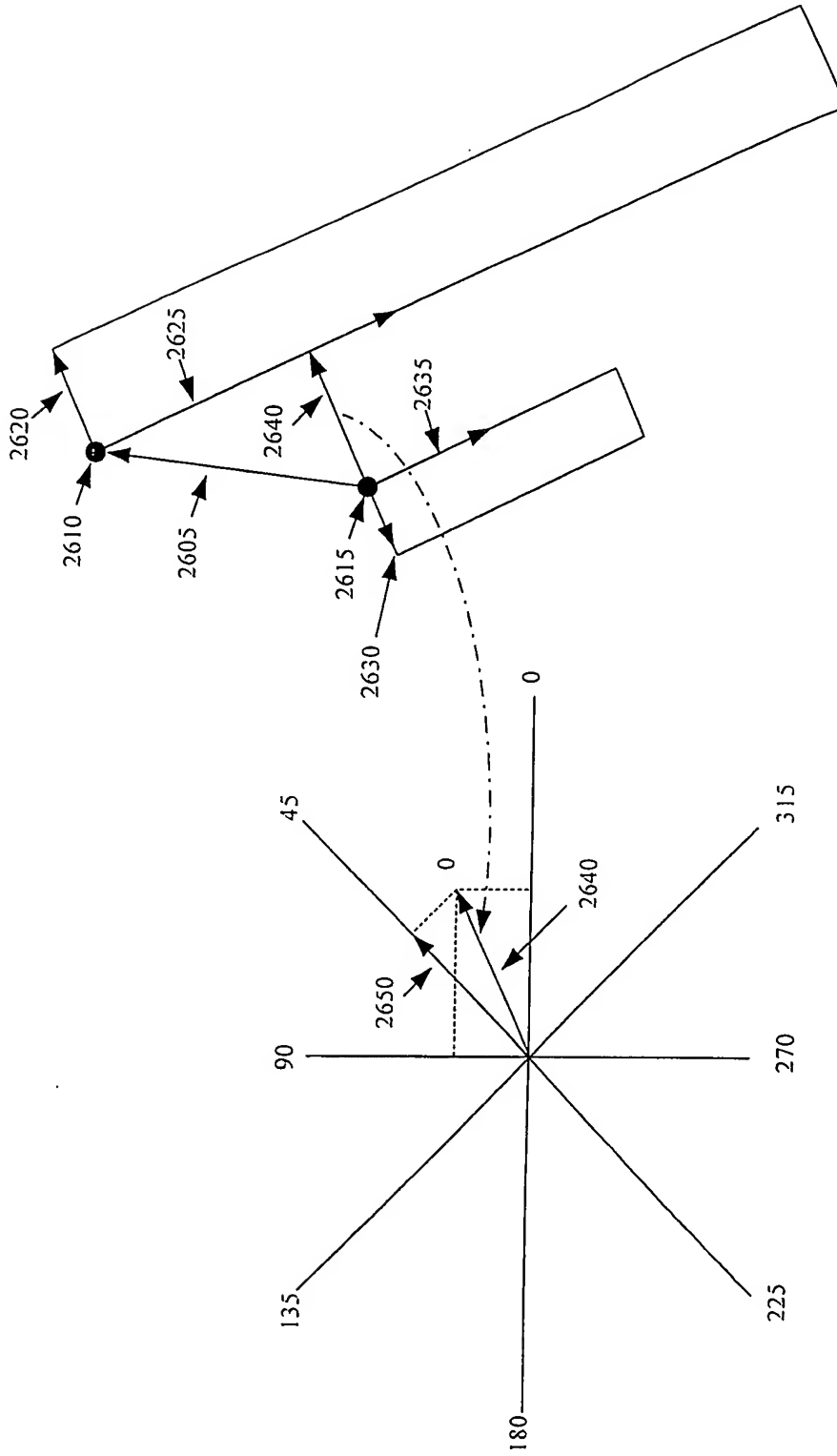


Figure 26

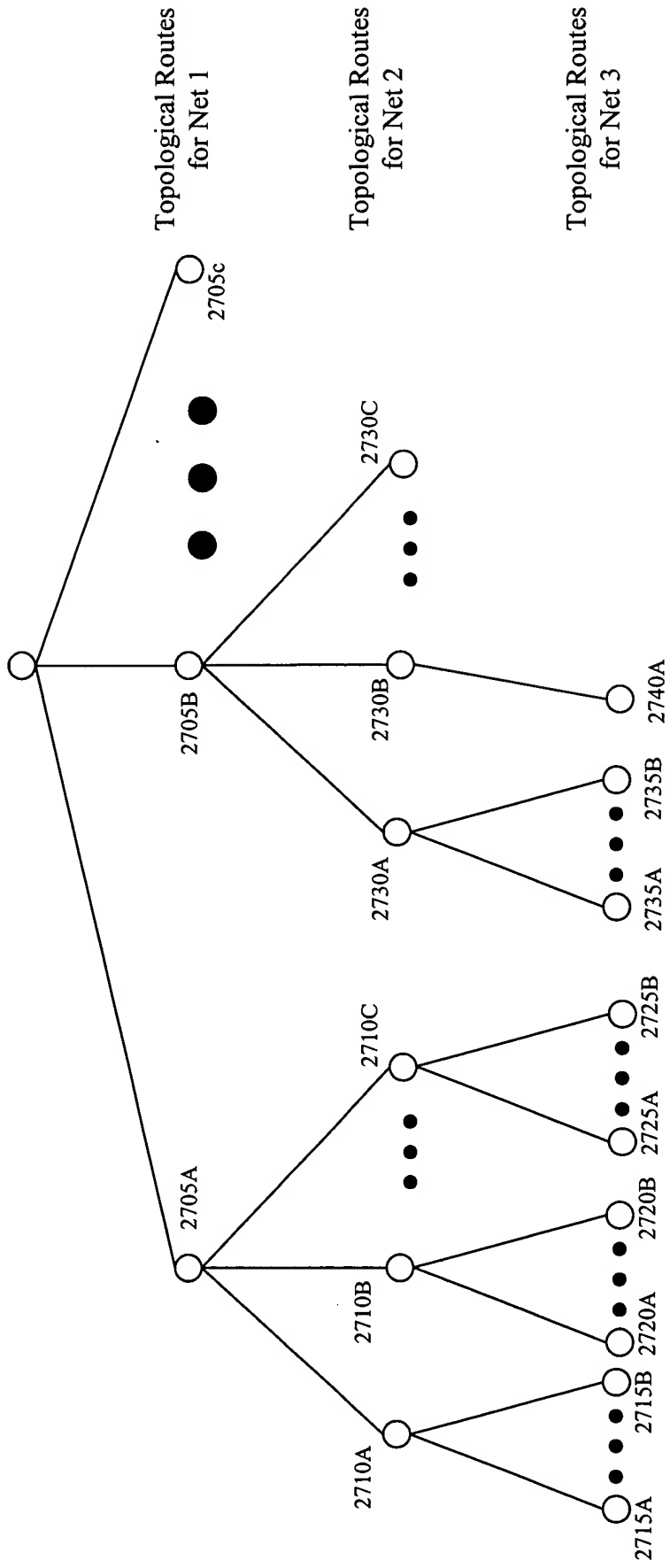


Figure 27

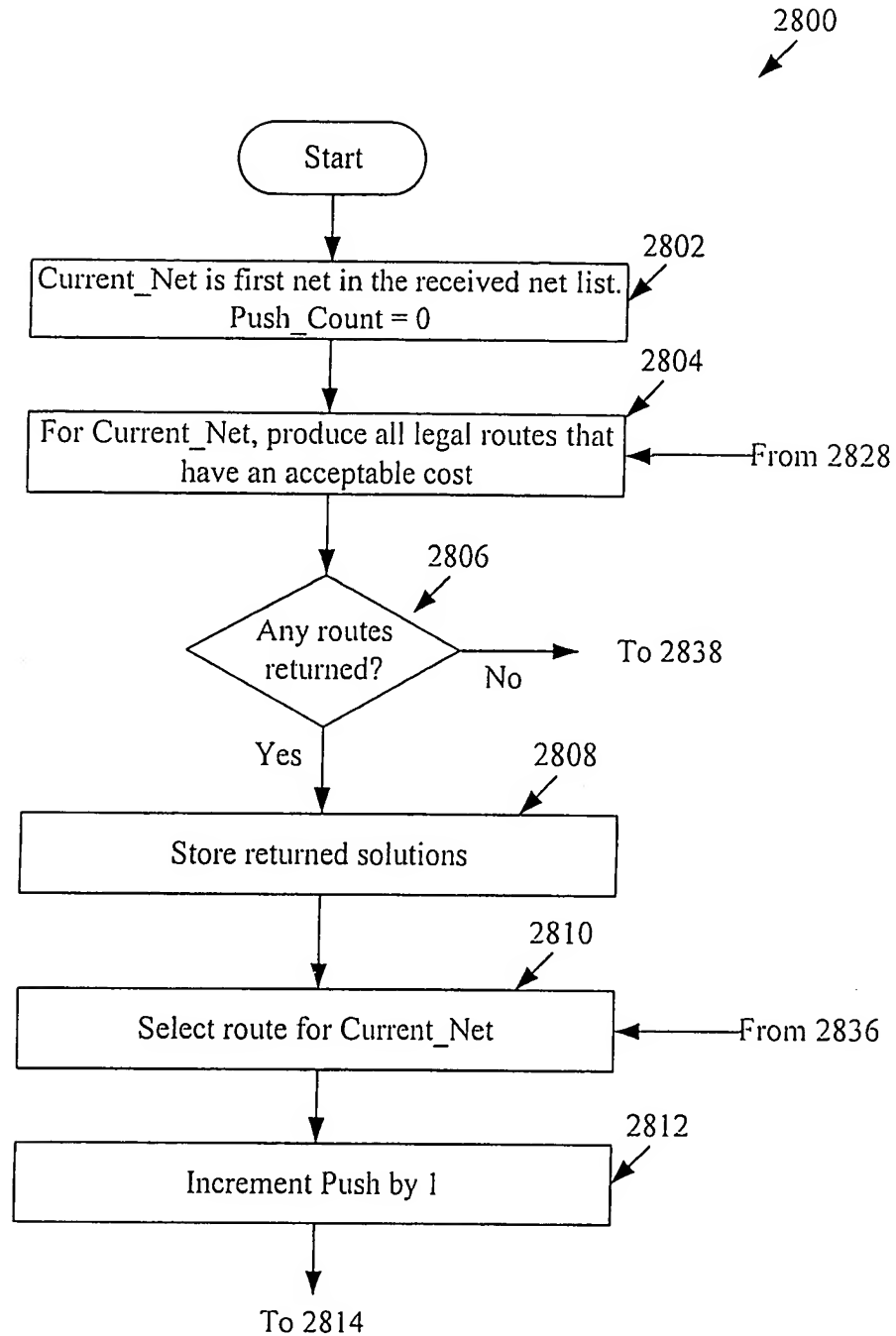
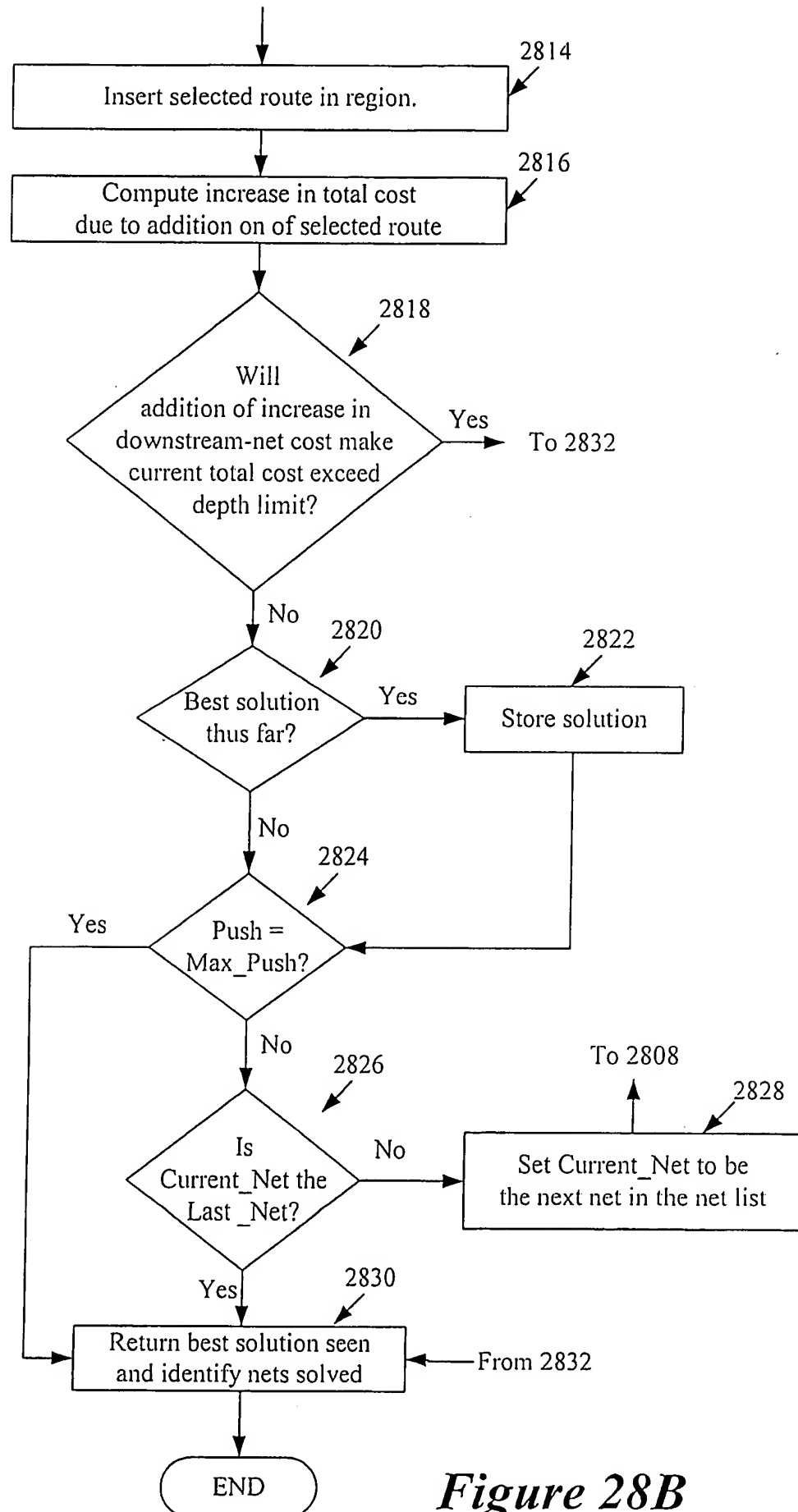
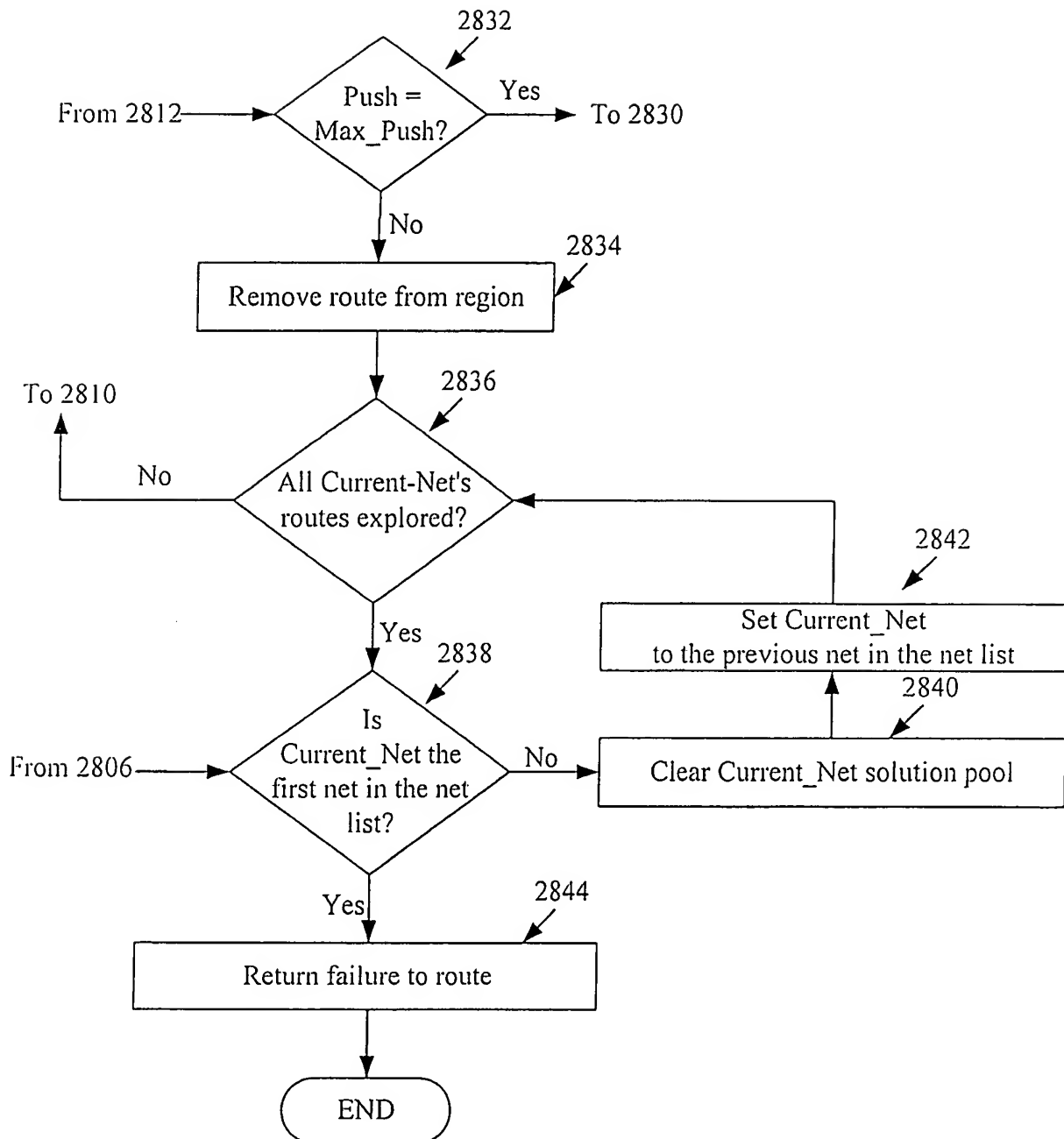


Figure 28A

Figure 28: $\frac{\text{Figure 28A}}{\text{Figure 28B} + \text{Figure 28C}}$

*Figure 28B*

*Figure 28C*

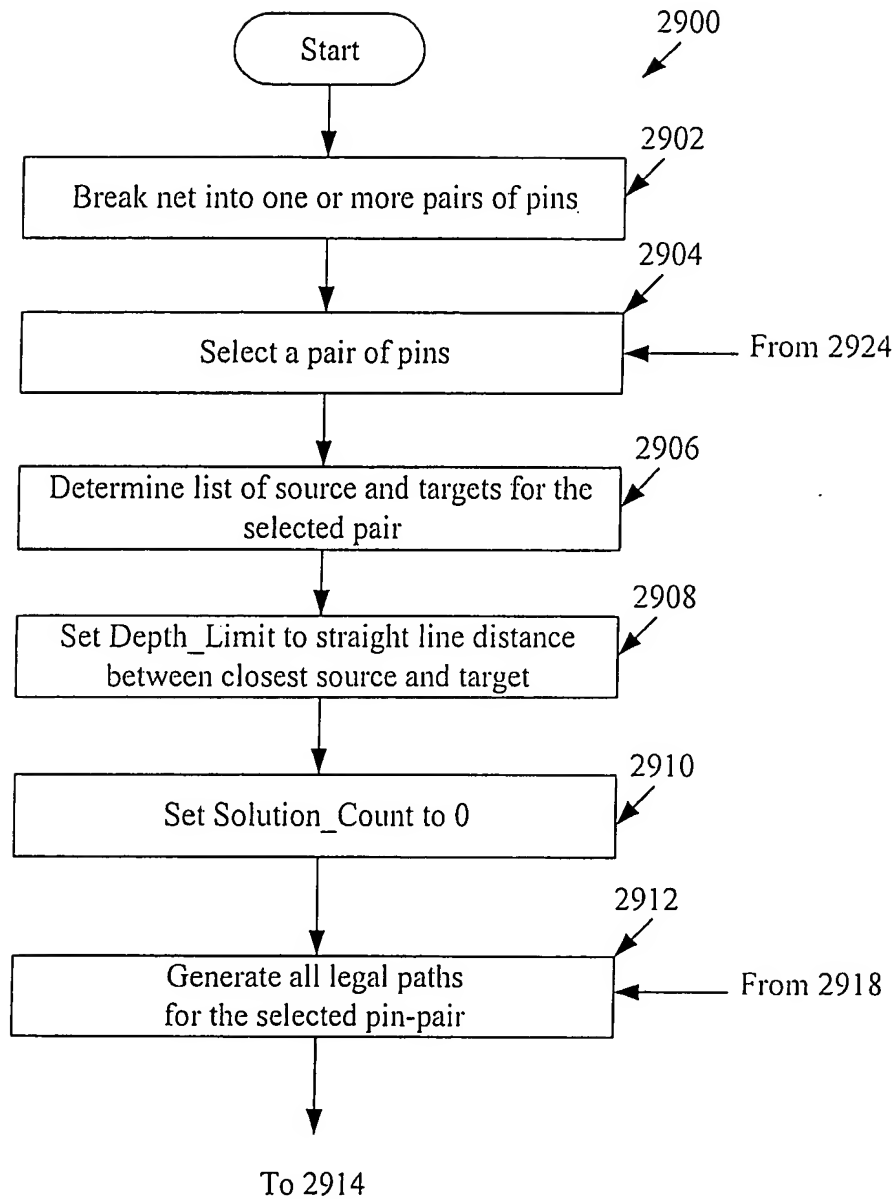
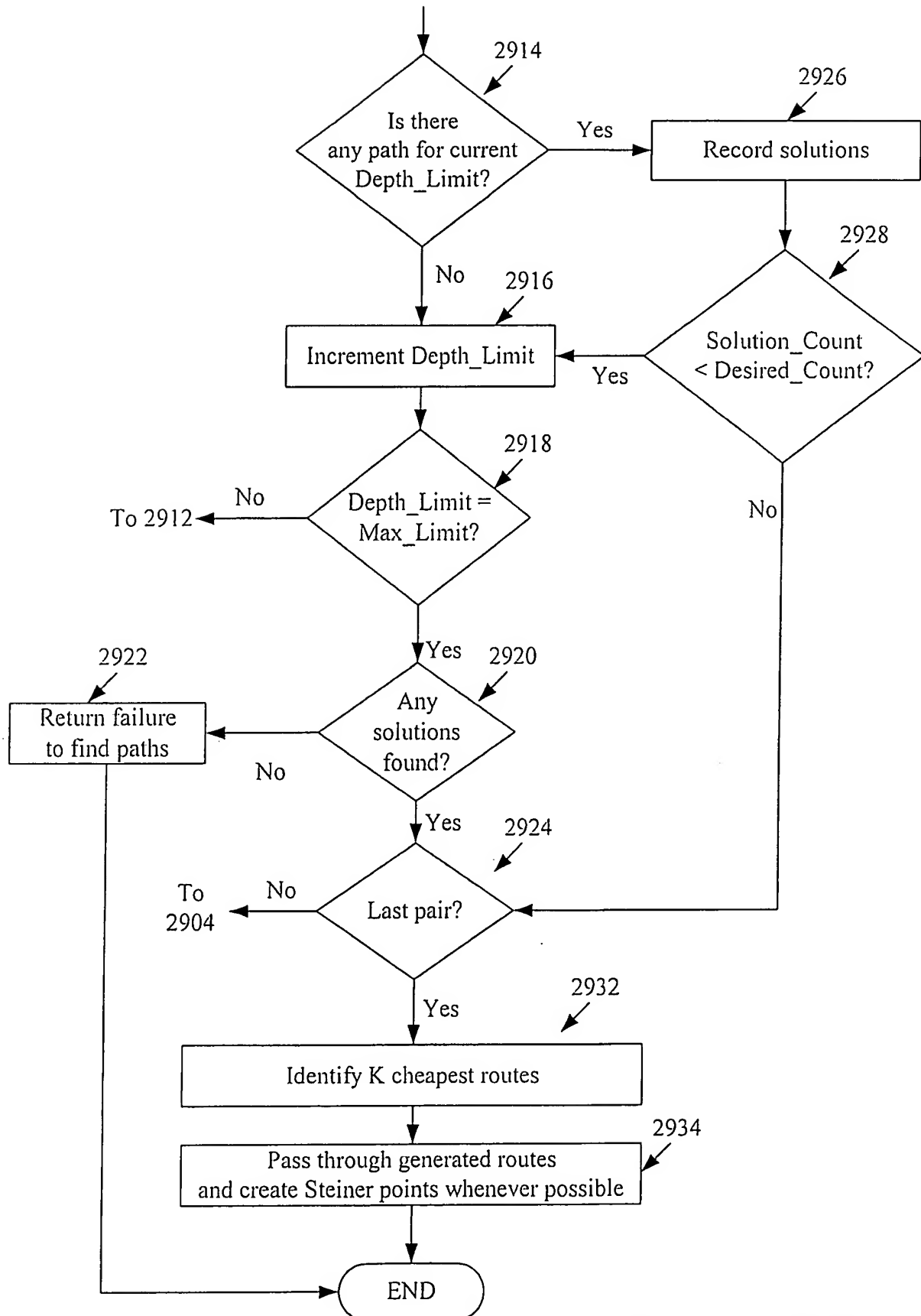


Figure 29A

Figure 29: $\frac{\text{Figure 29A}}{\text{Figure 29B}}$

*Figure 29B*

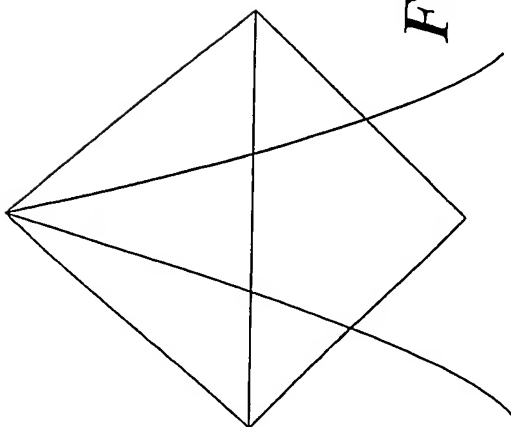


Figure 30A

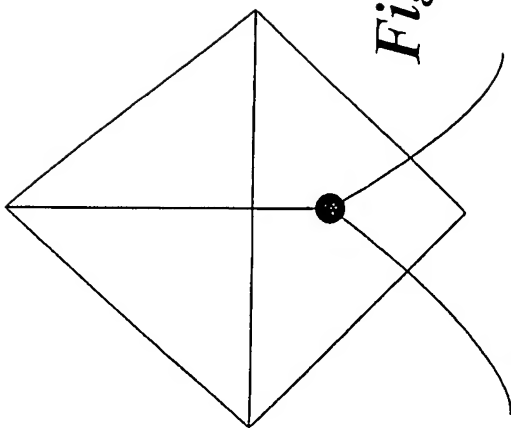


Figure 30B

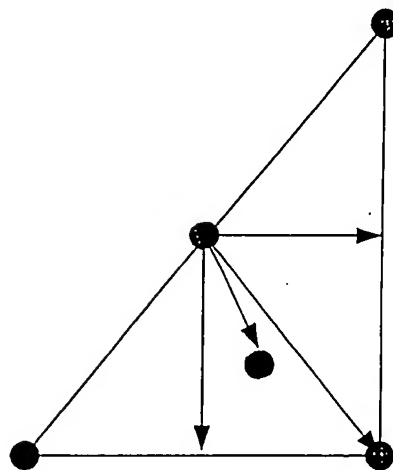


Figure 32

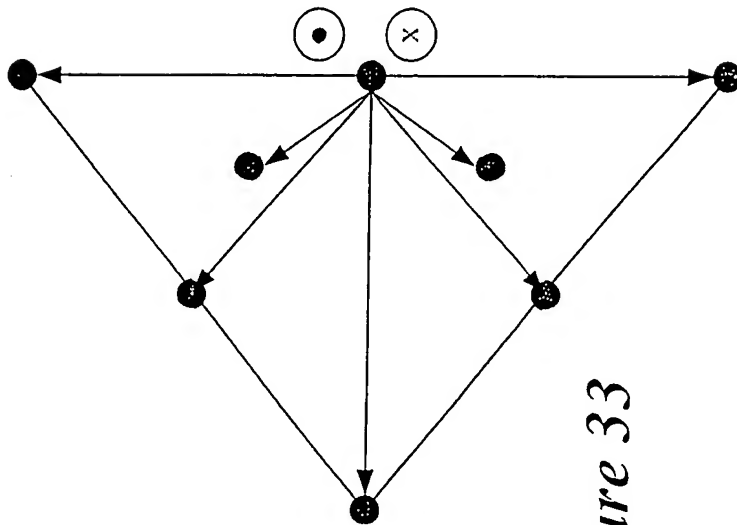


Figure 33

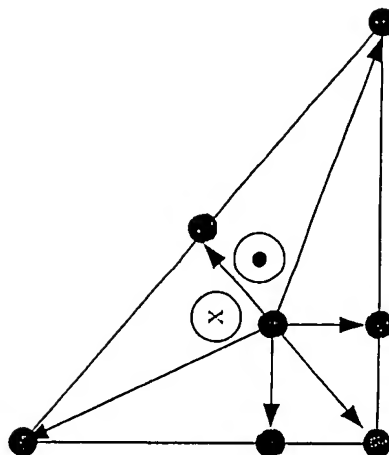


Figure 34

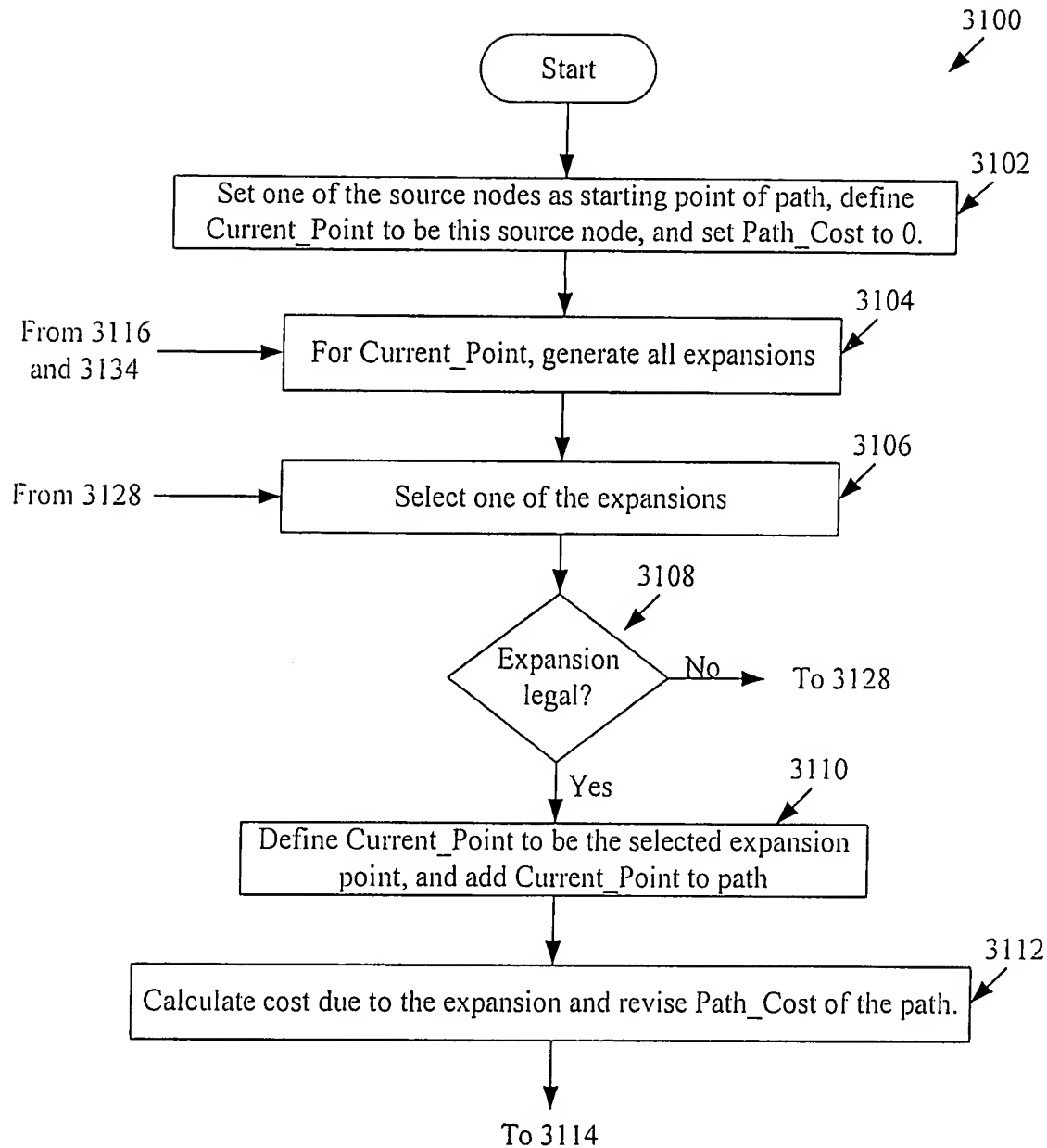


Figure 31A

Figure 31: $\frac{\text{Figure 31A}}{\text{Figure 31B}}$

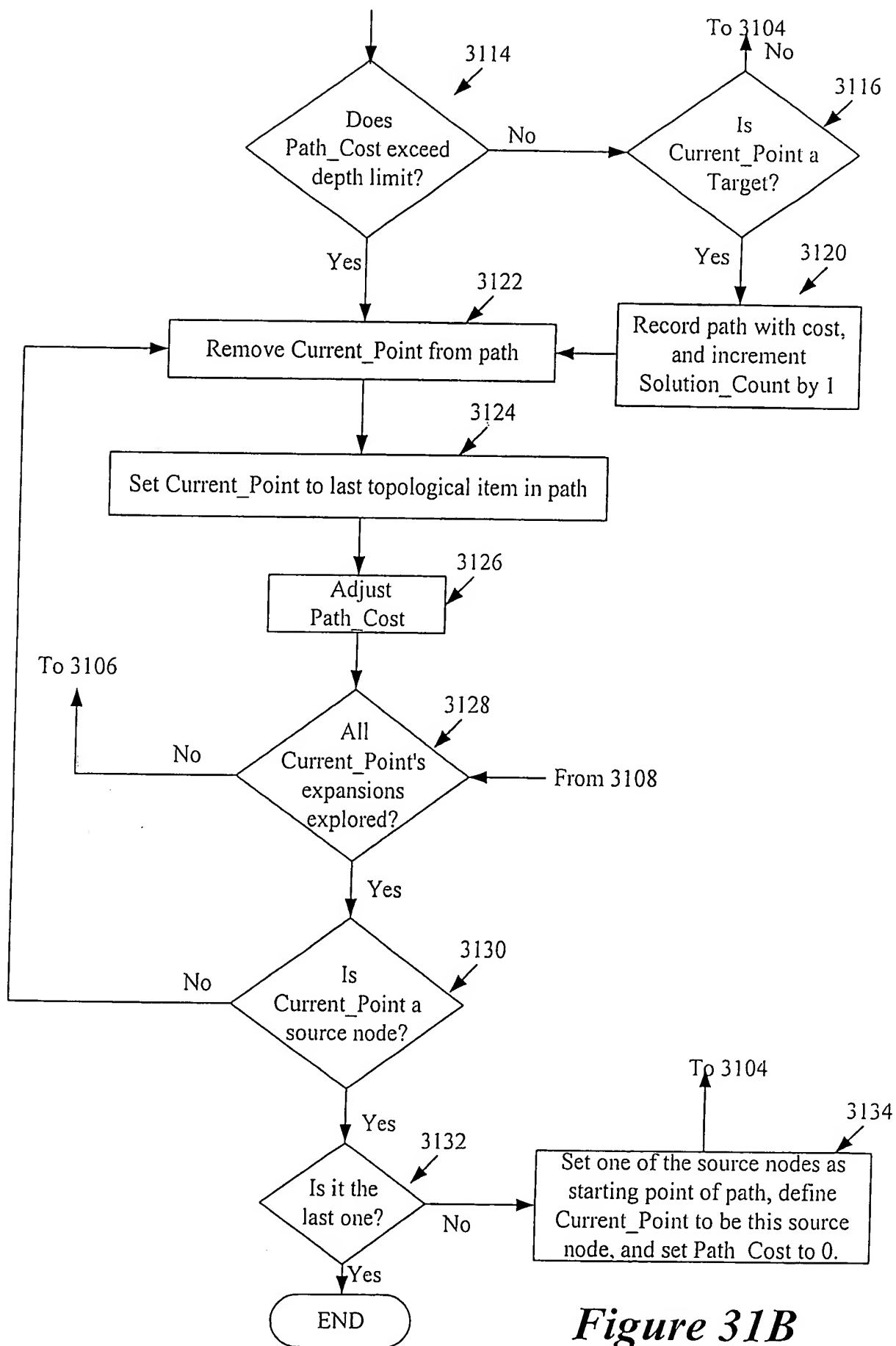


Figure 31B

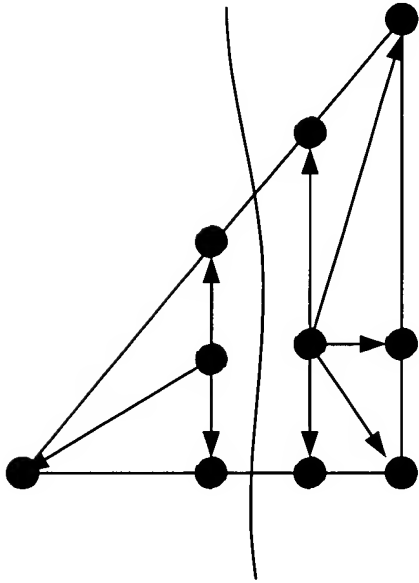


Figure 35

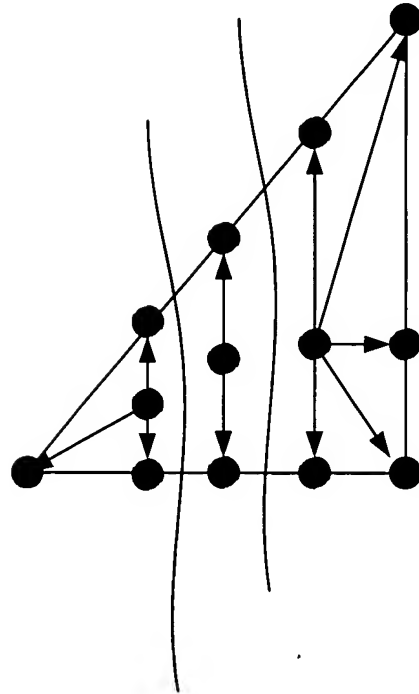


Figure 36

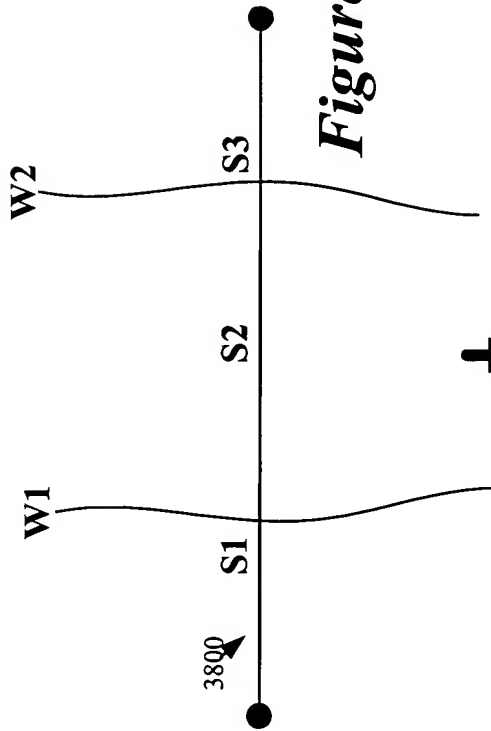


Figure 38A

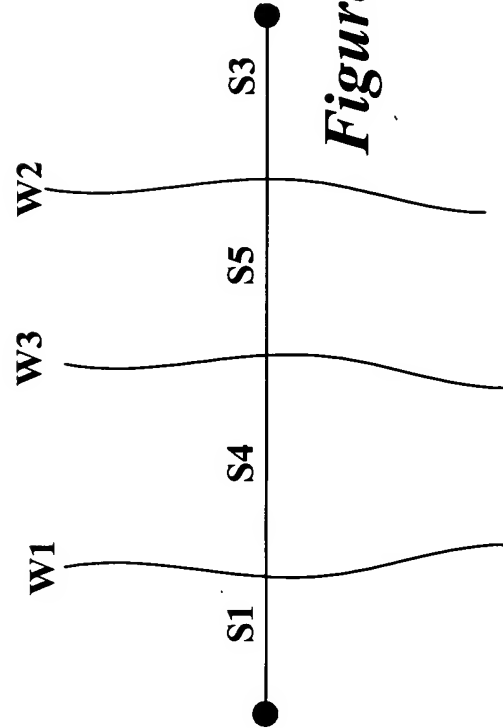
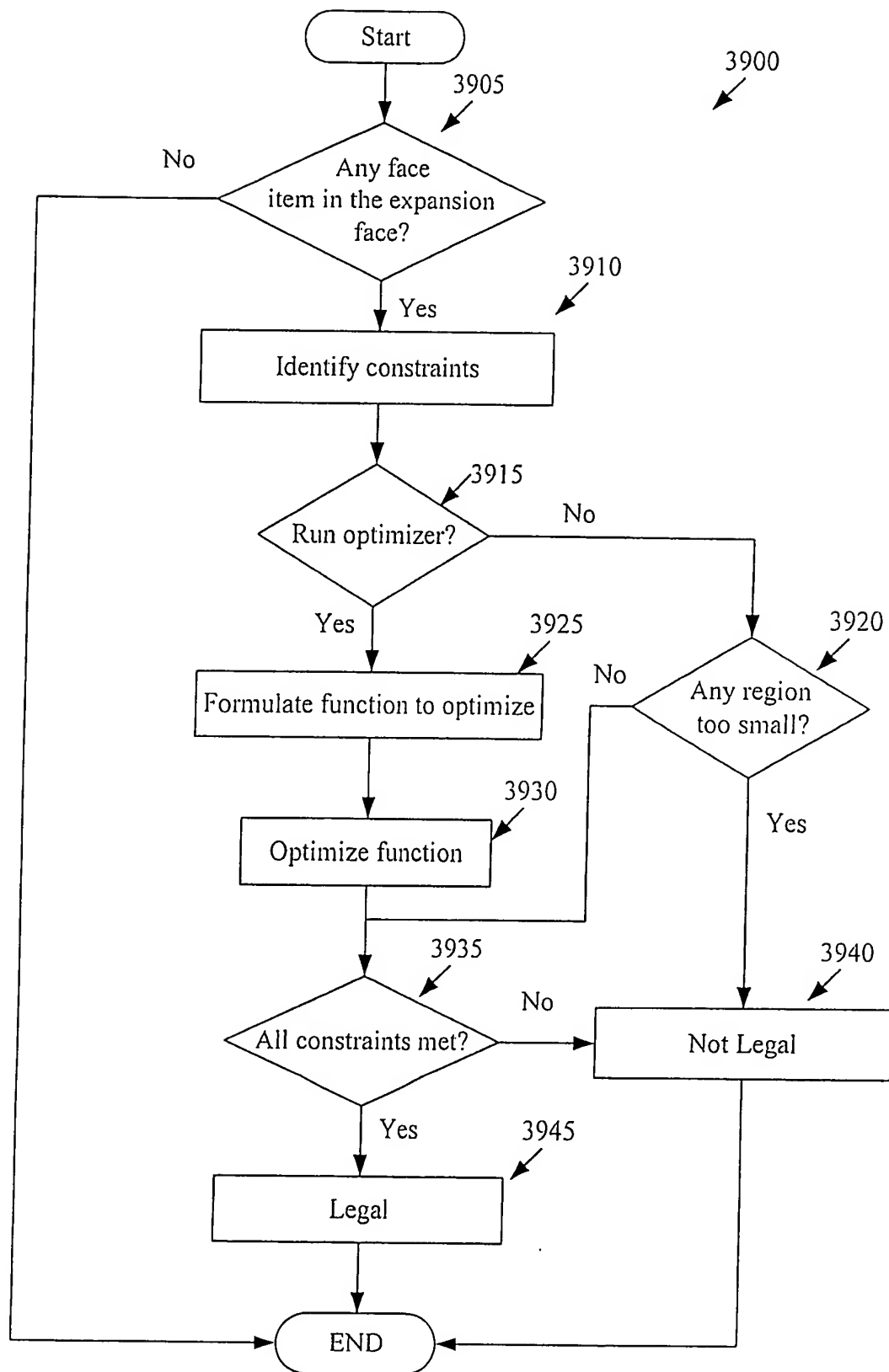
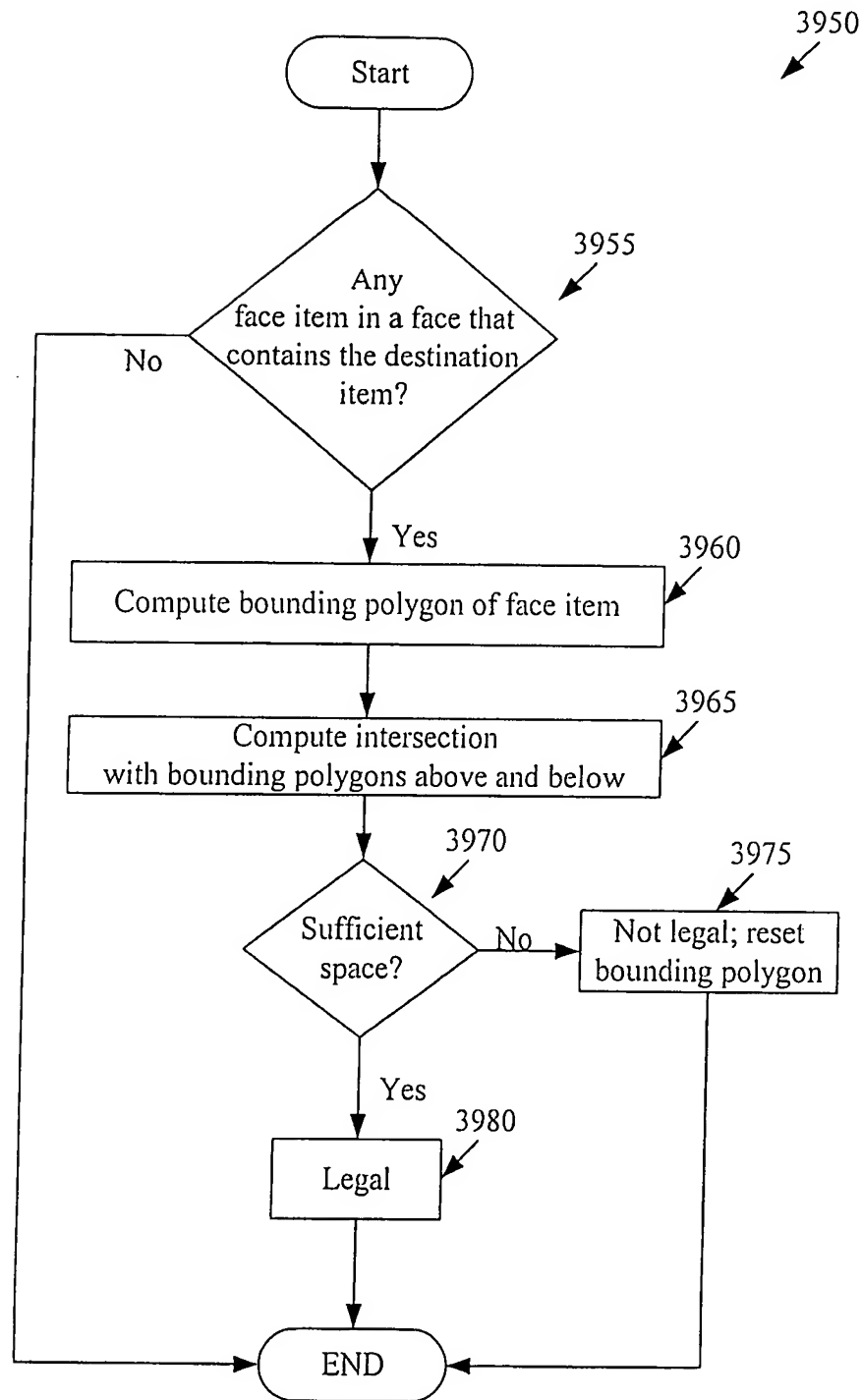


Figure 38B

To: Node		Face Item	Edge Item
From:	Node	<ul style="list-style-type: none"> • Vias 	<ul style="list-style-type: none"> • Planarity • Vias • Edge Capacity
	Face Item	<ul style="list-style-type: none"> • Vias 	<ul style="list-style-type: none"> • Vias • Edge Capacity
	Edge Item	<ul style="list-style-type: none"> • Planarity • Vias 	<ul style="list-style-type: none"> • Planarity • Vias • Edge Capacity

Figure 37

*Figure 39A*

*Figure 39B*

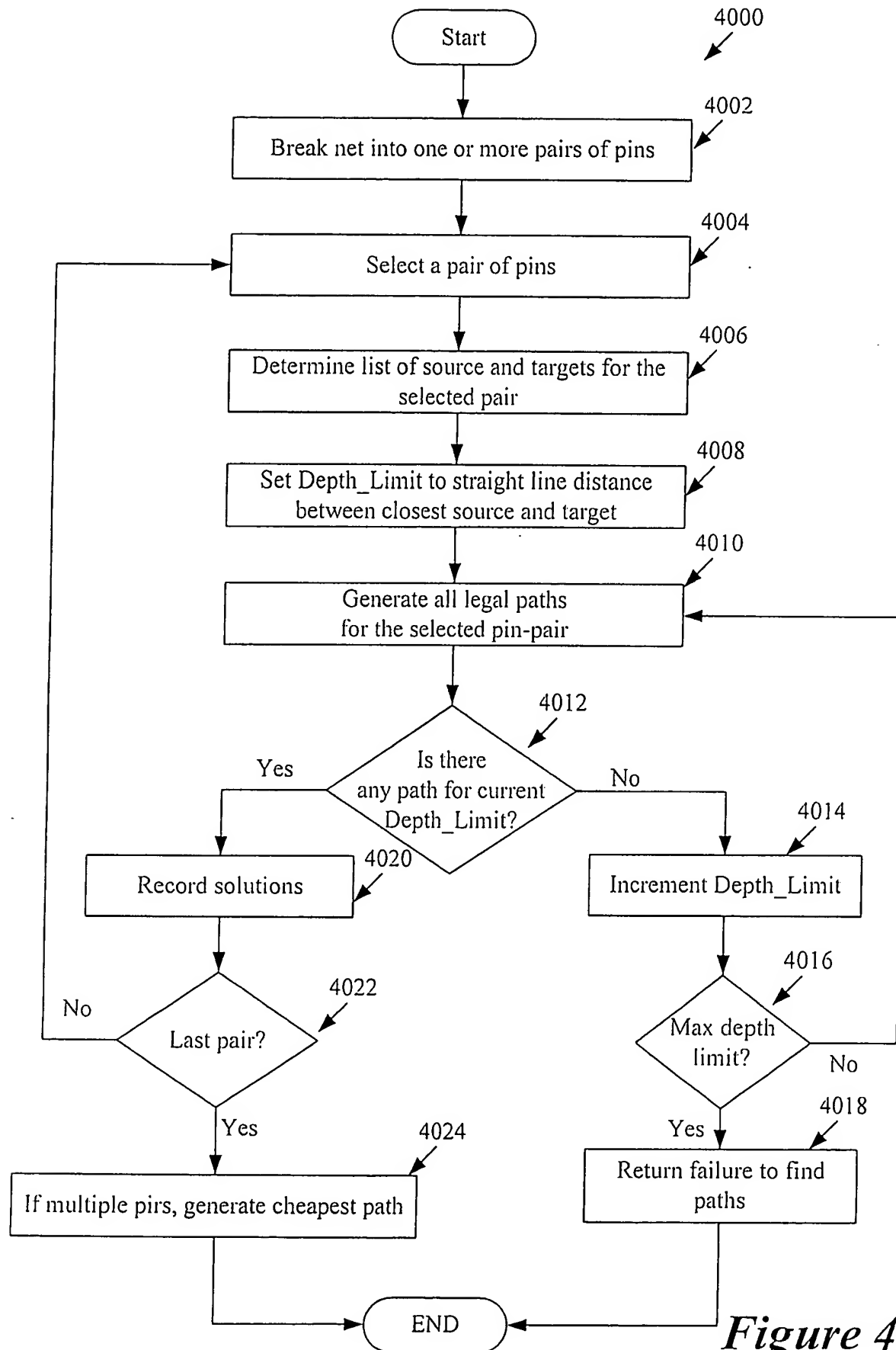
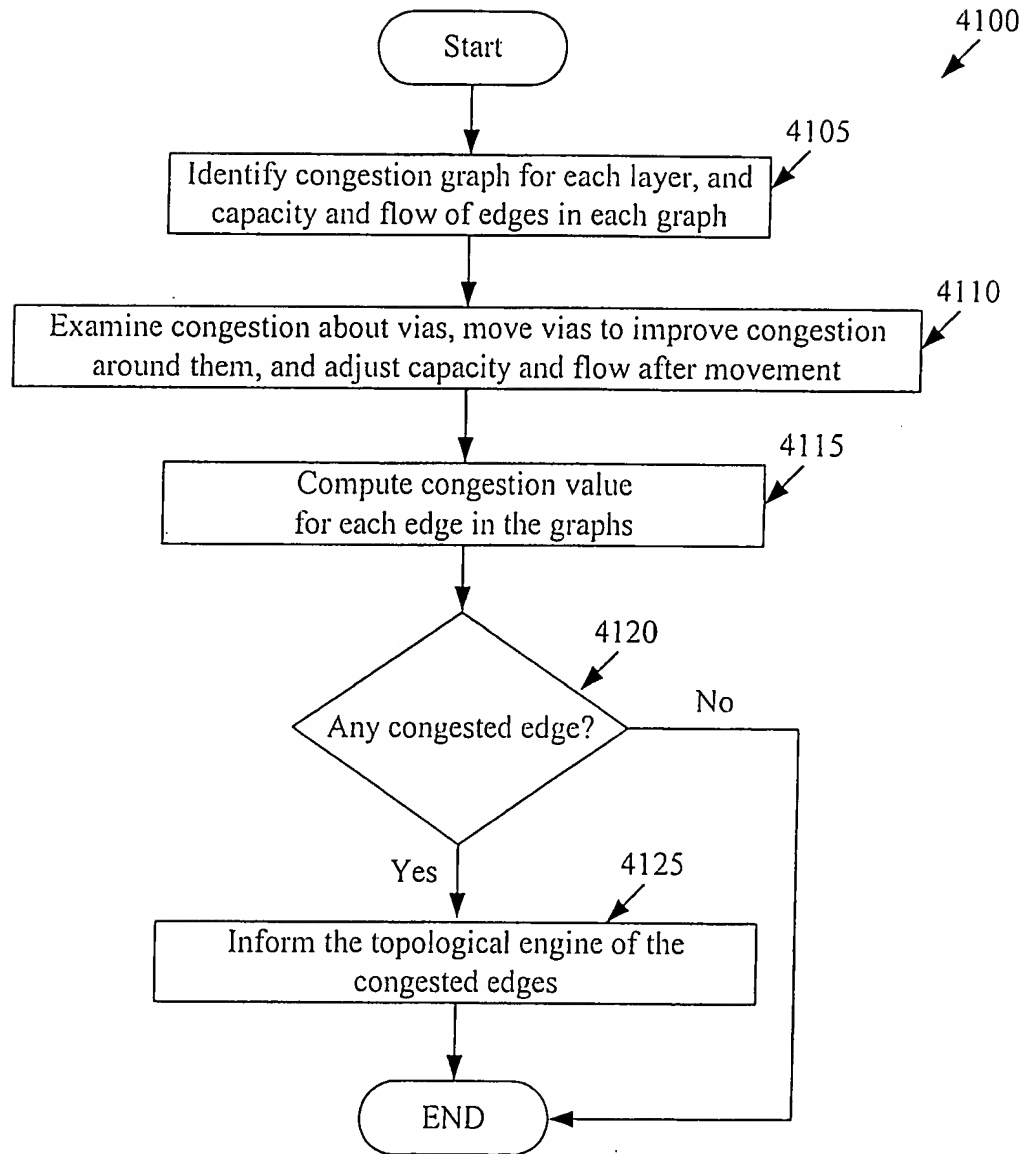


Figure 40

*Figure 41*

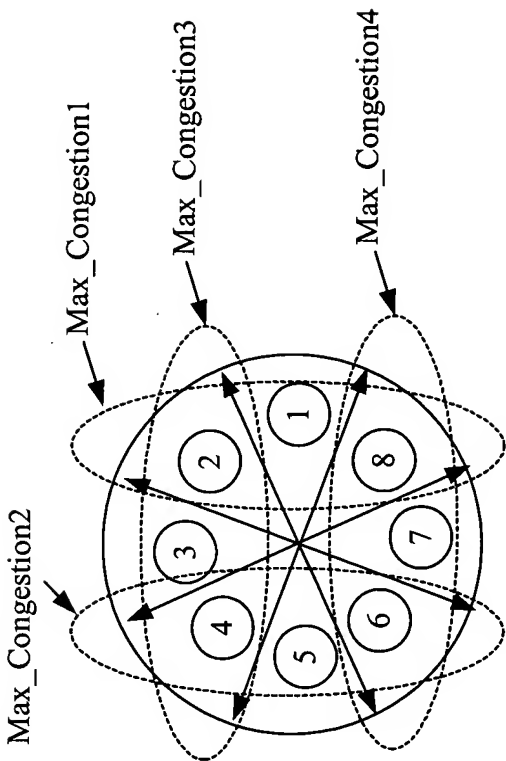


Figure 44

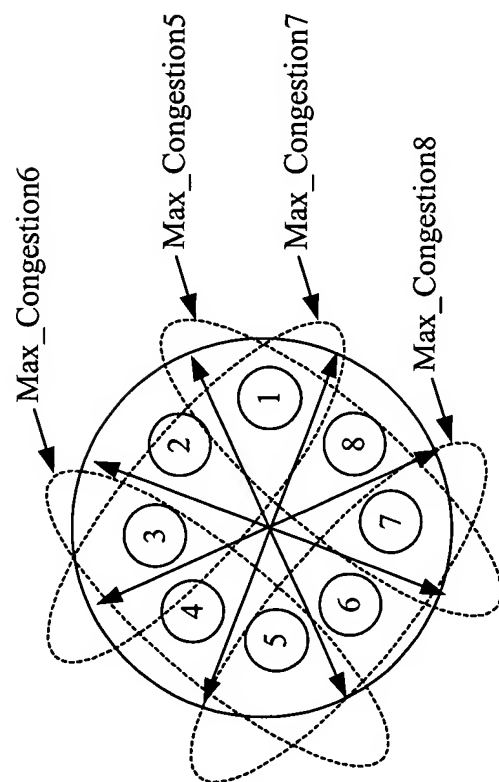


Figure 45

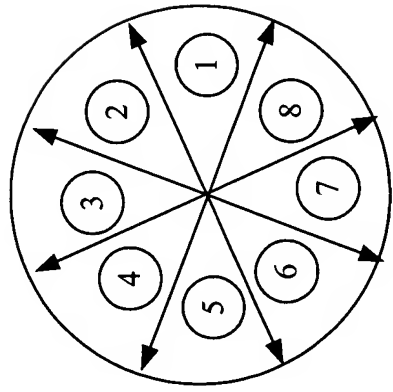


Figure 42

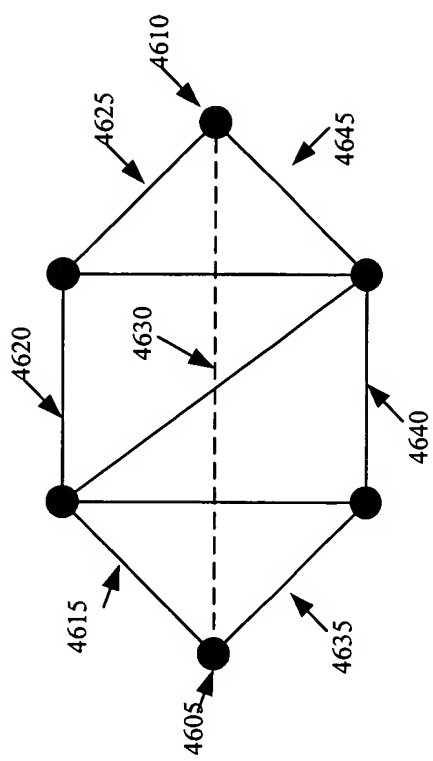
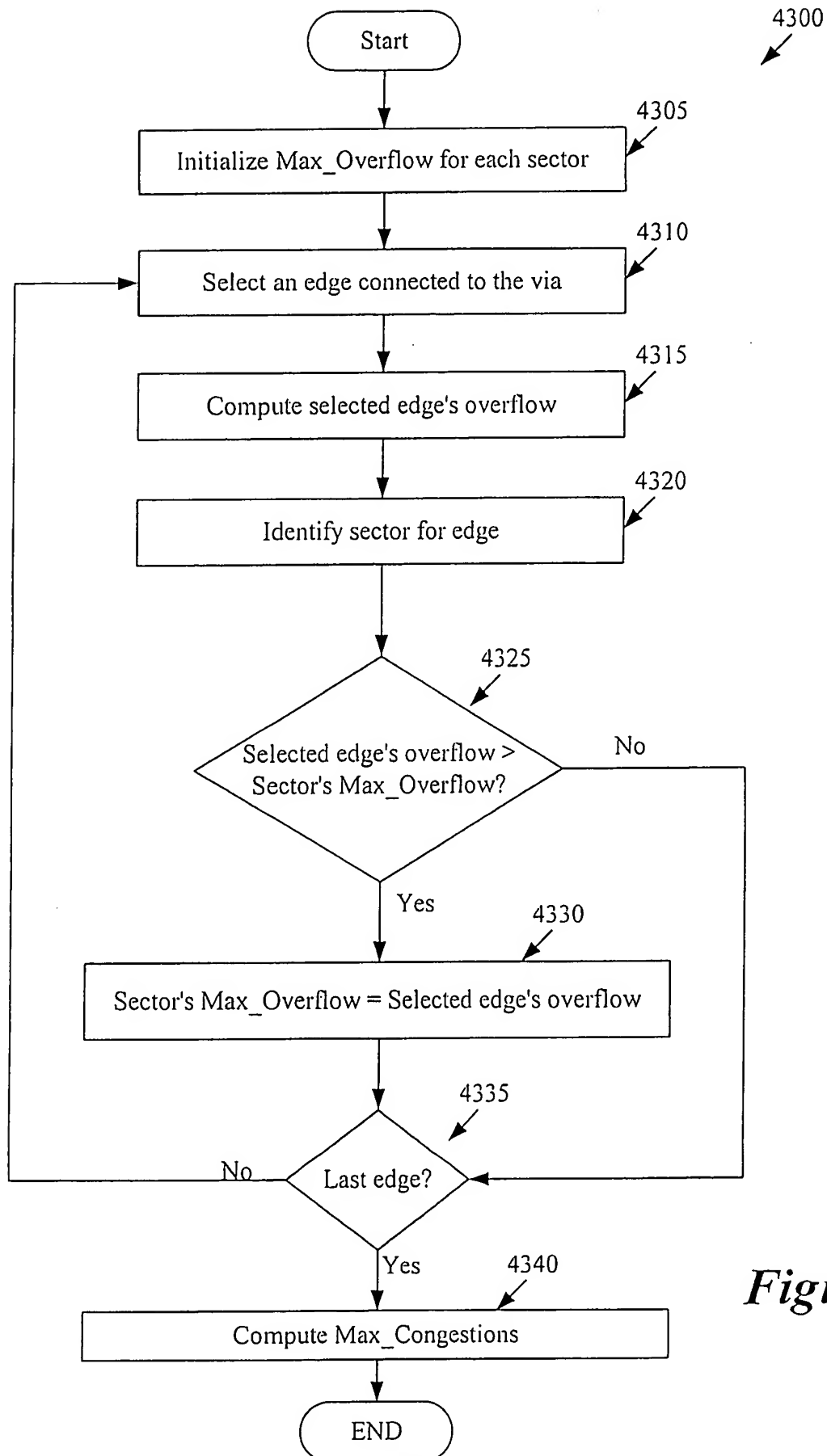


Figure 46

*Figure 43*

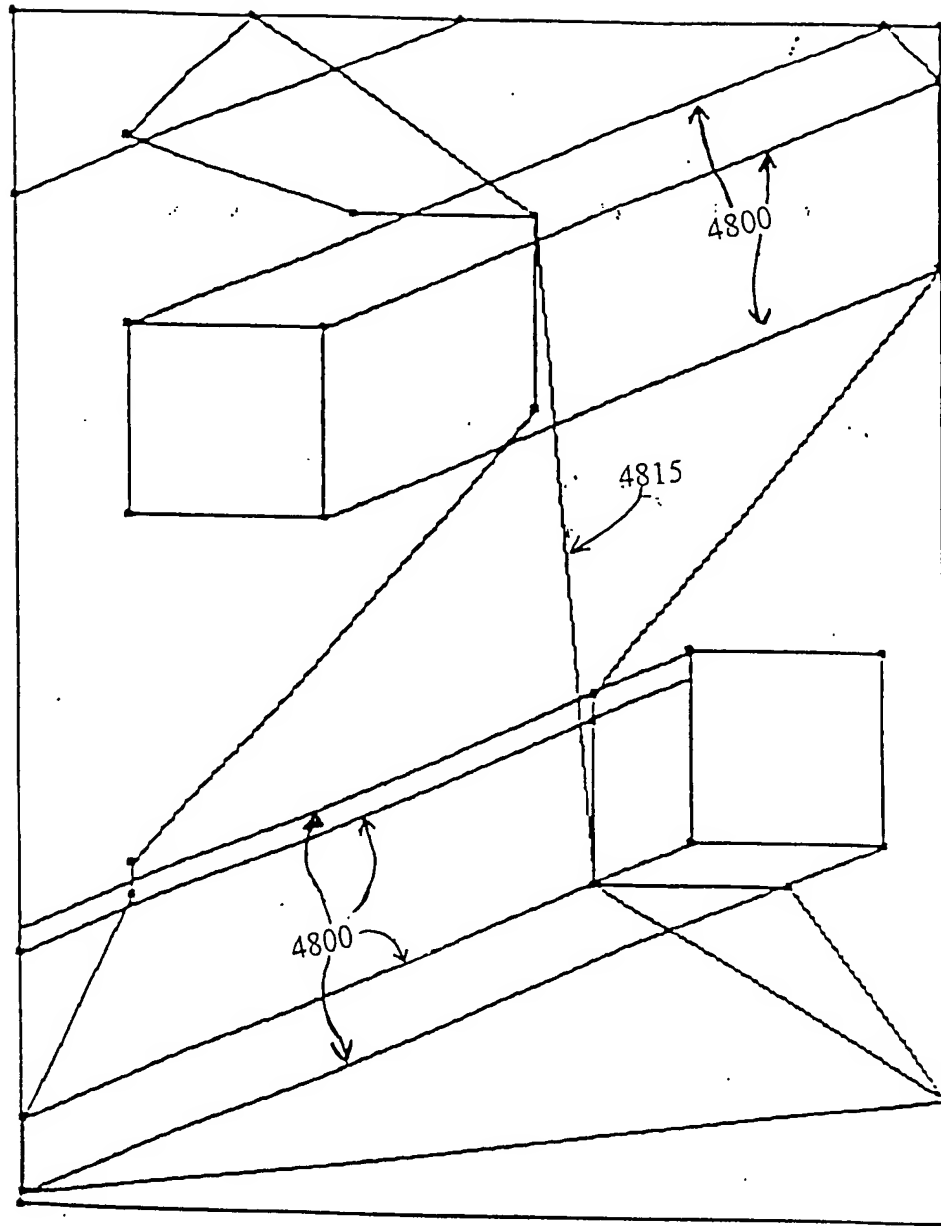


FIGURE 48A

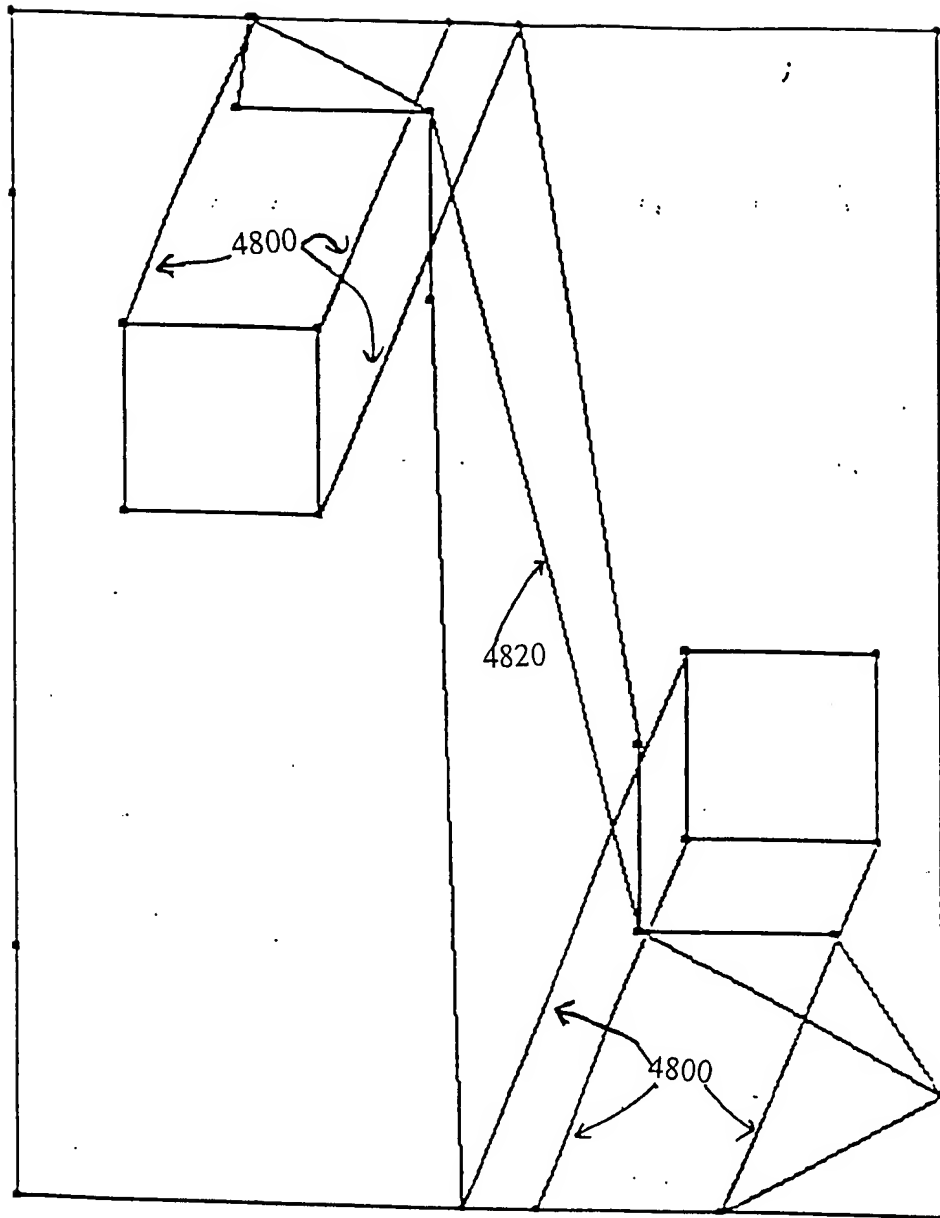


FIGURE 48B

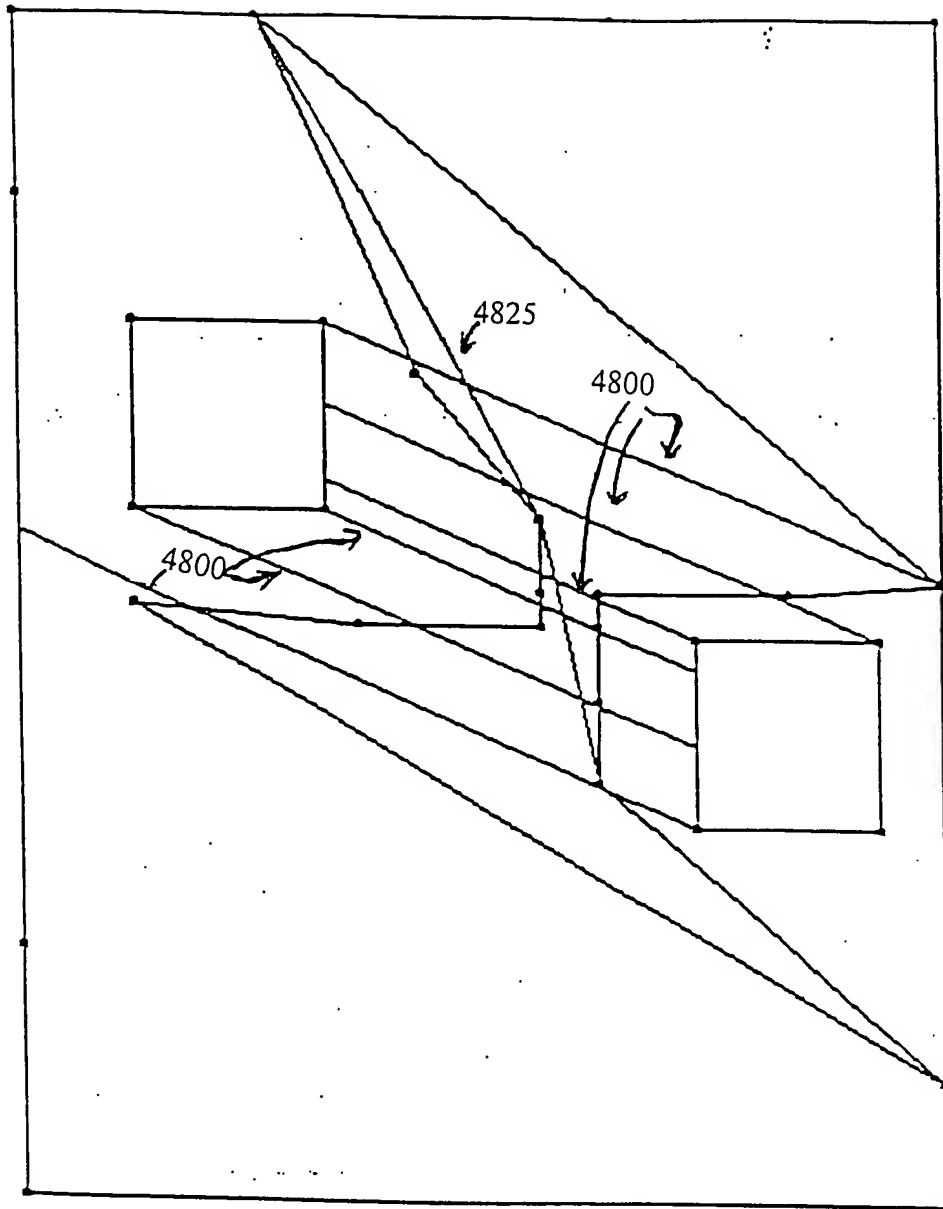


FIGURE 48C

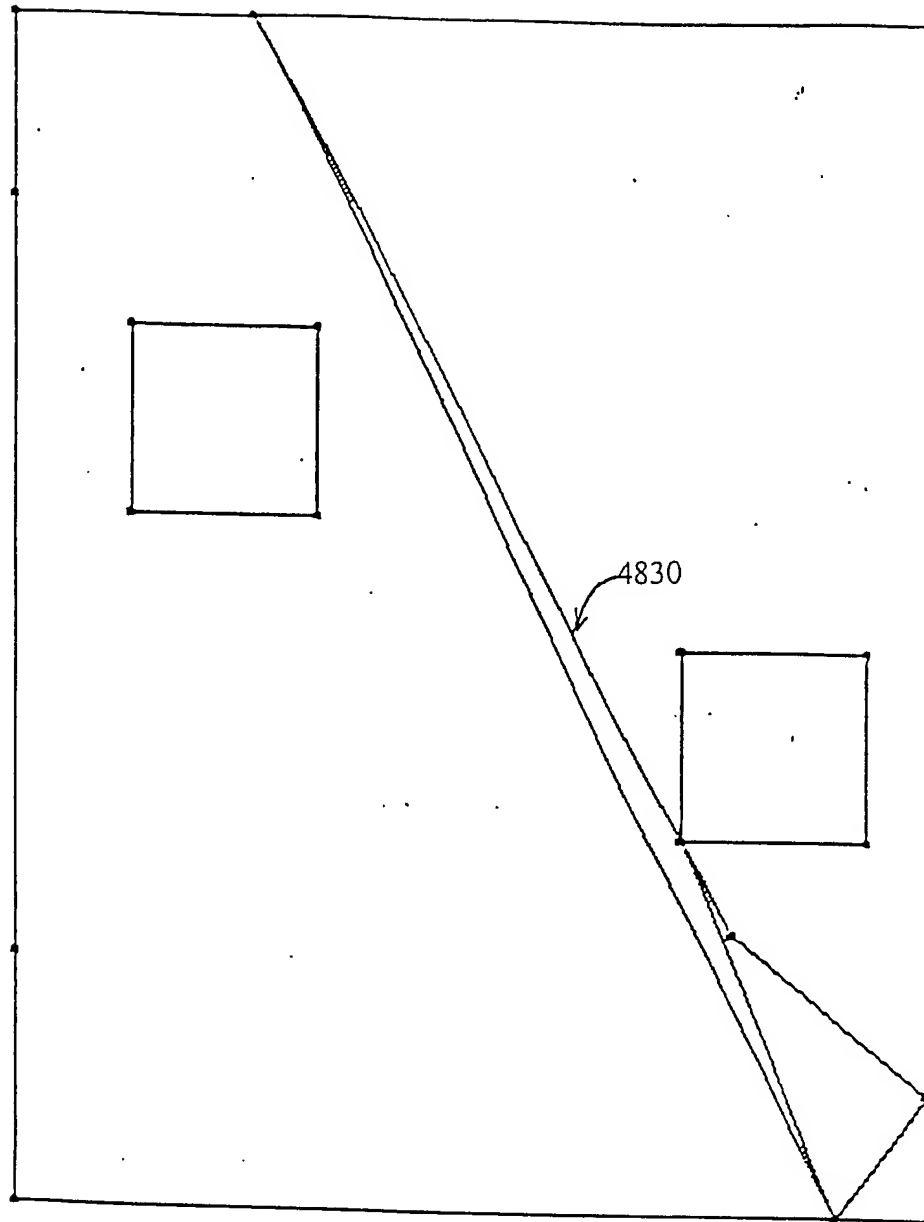


FIGURE 48D



Figure 49A

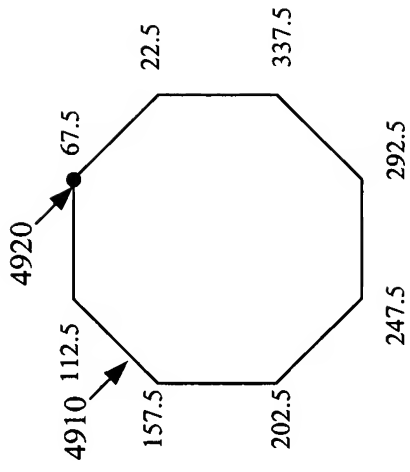


Figure 49B

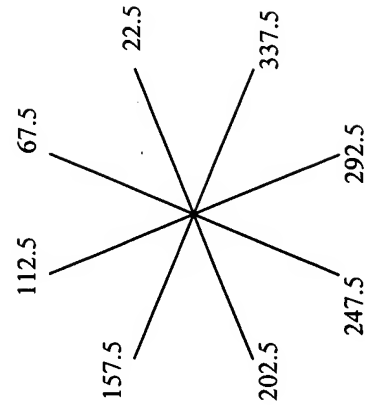


Figure 49C

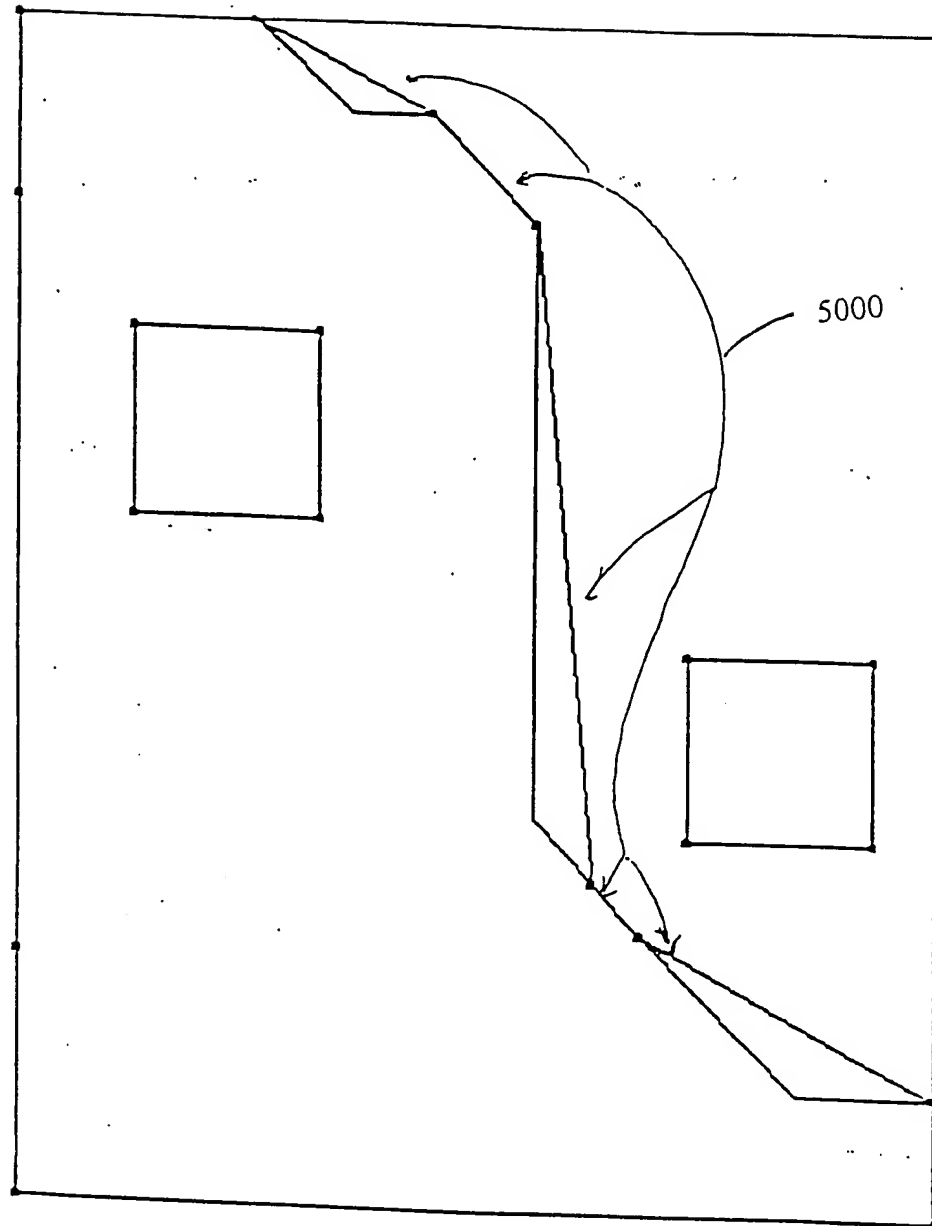


FIGURE 50

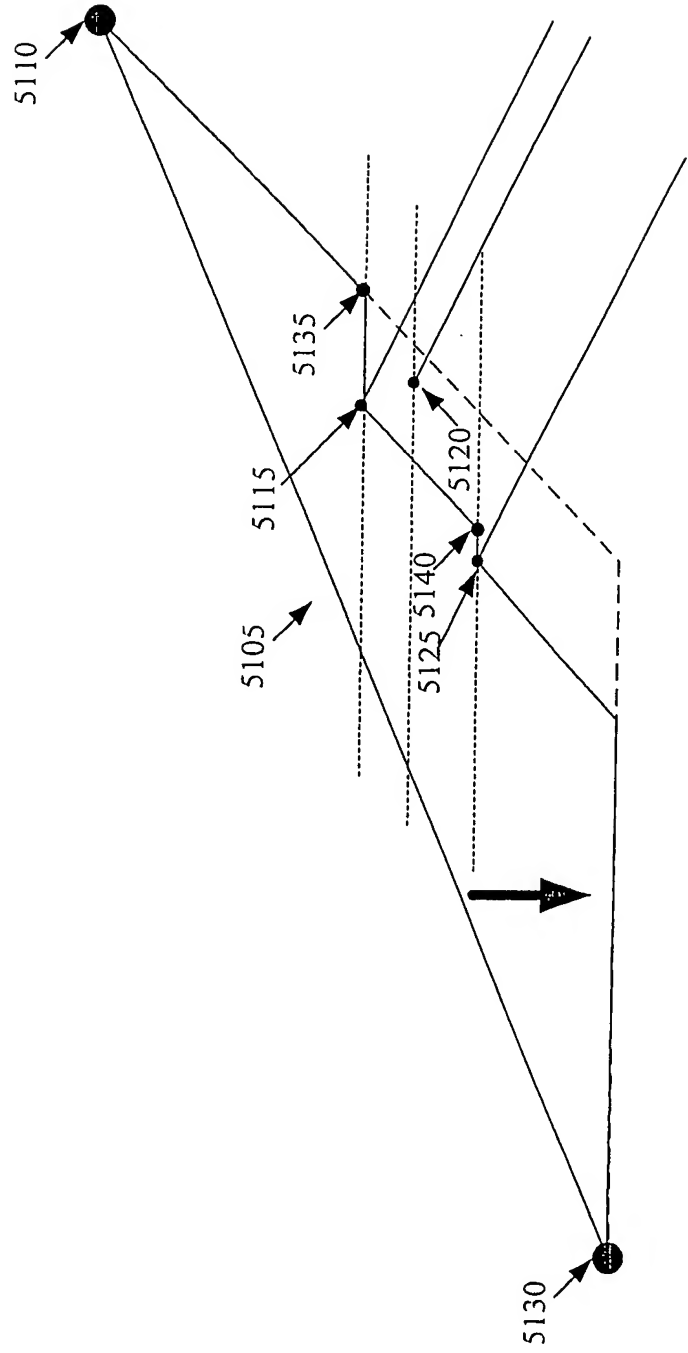


Figure 51

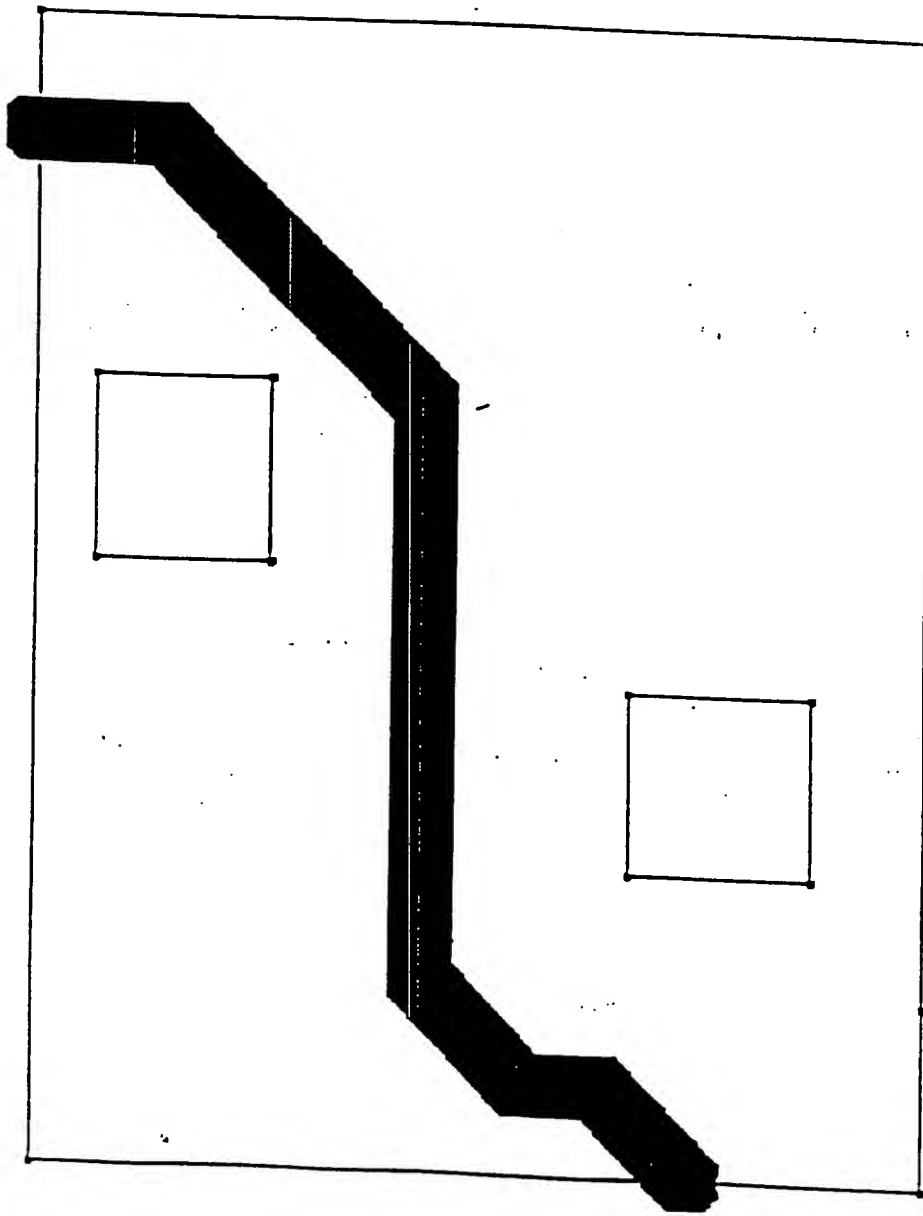


FIGURE 52

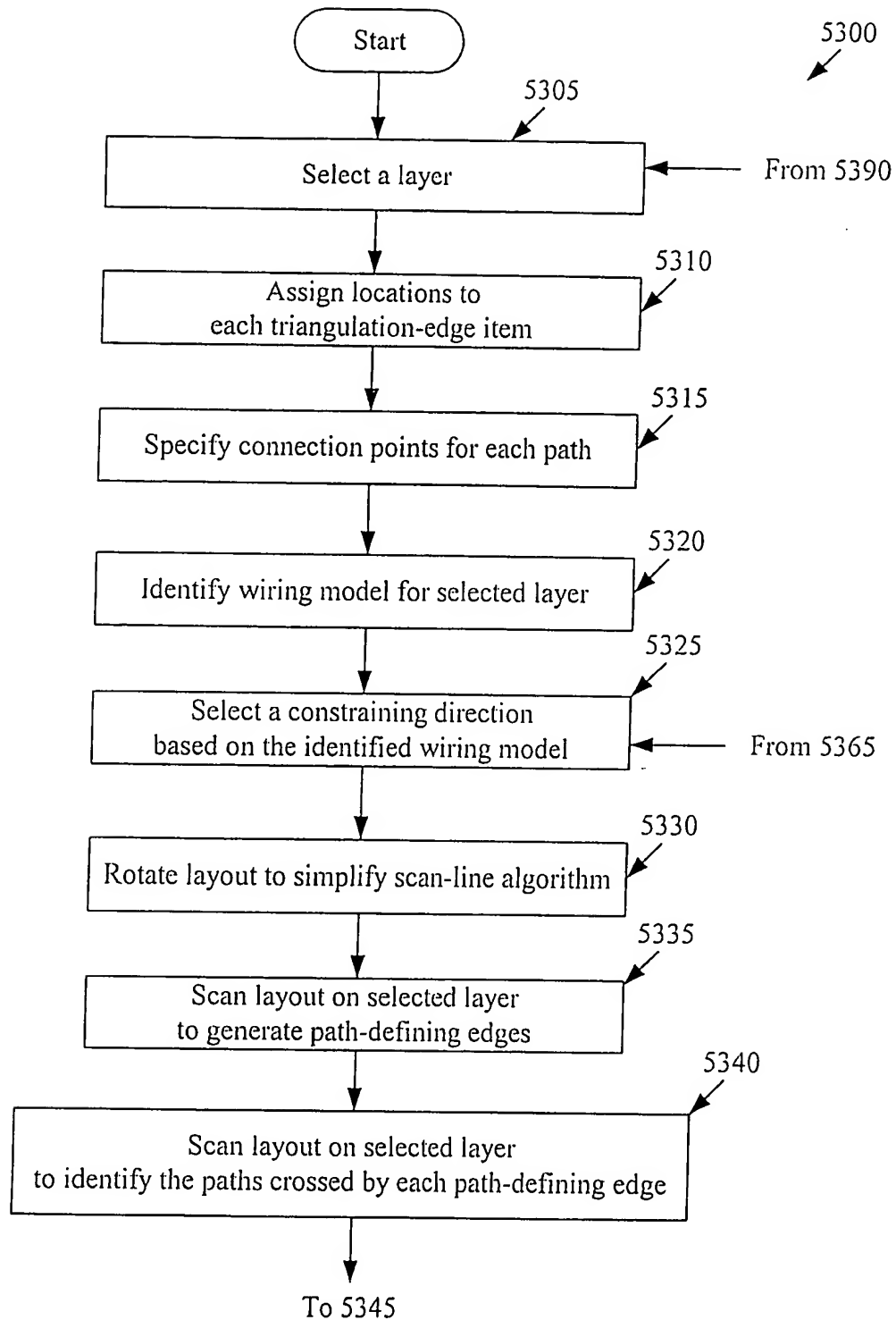
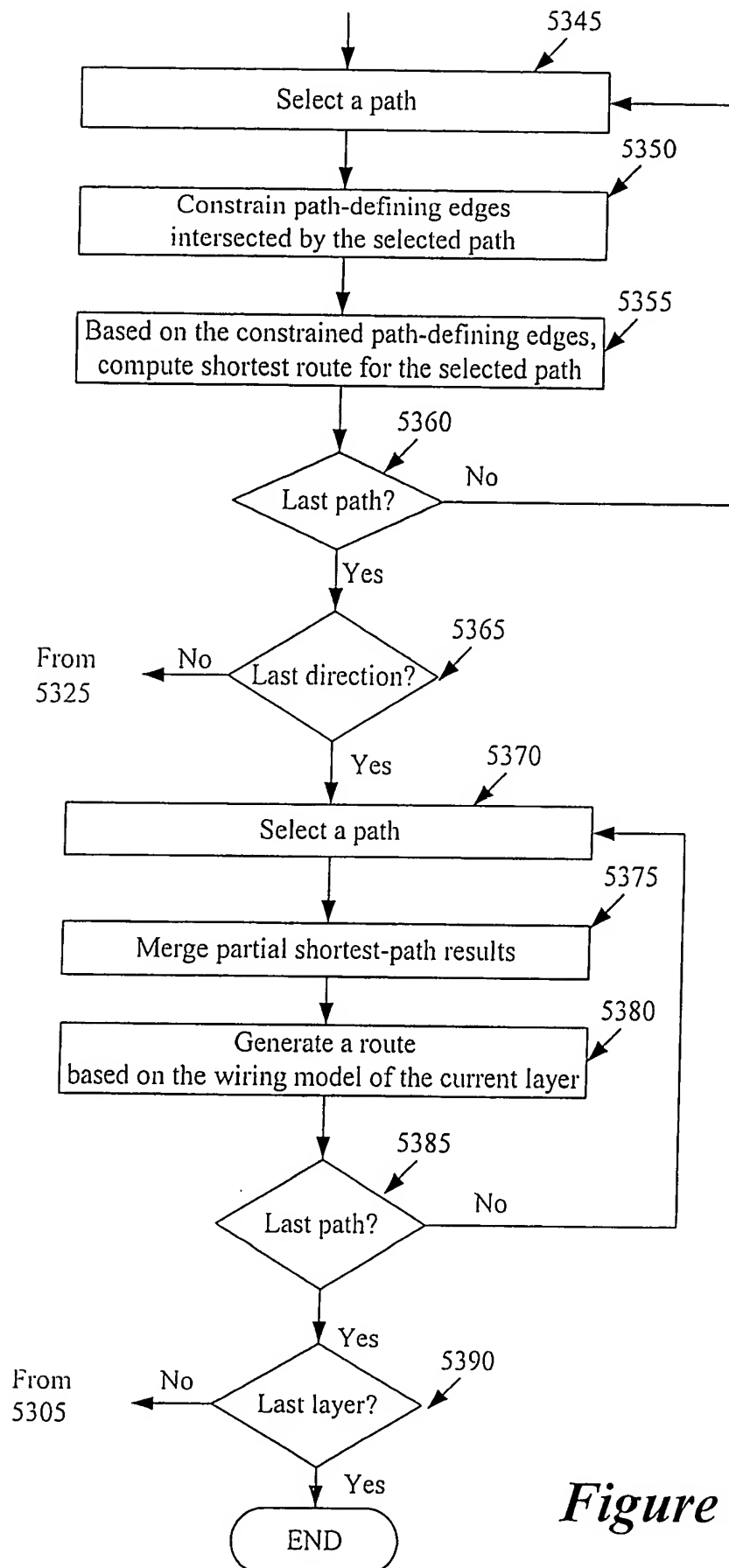


Figure 53

Figure 53: *Figure 53A*
Figure 53B

*Figure 53B*

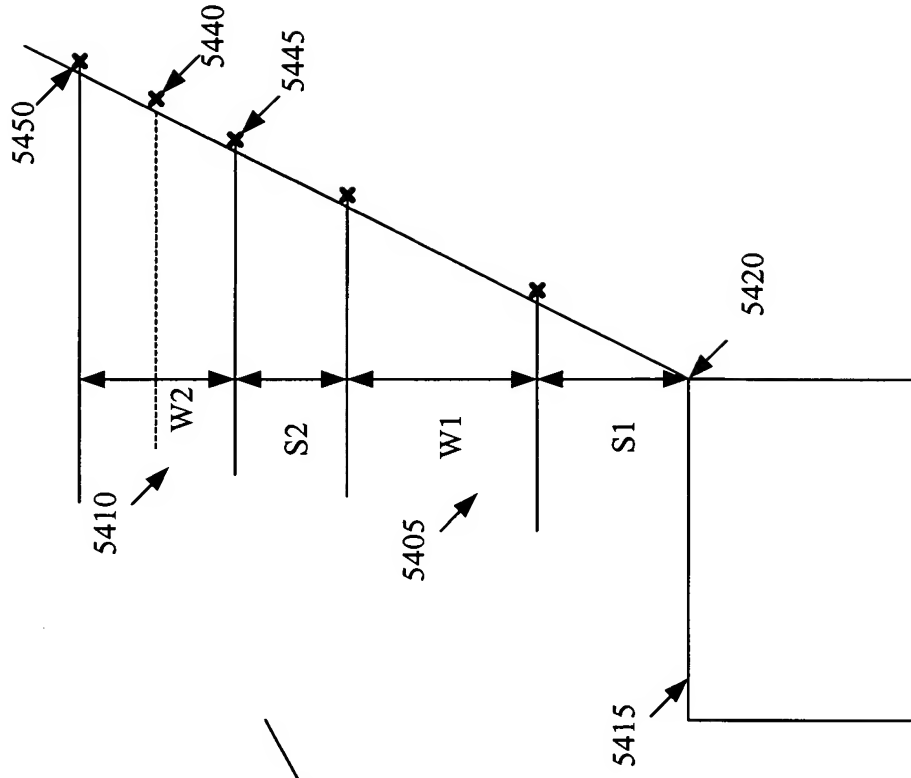


Figure 55

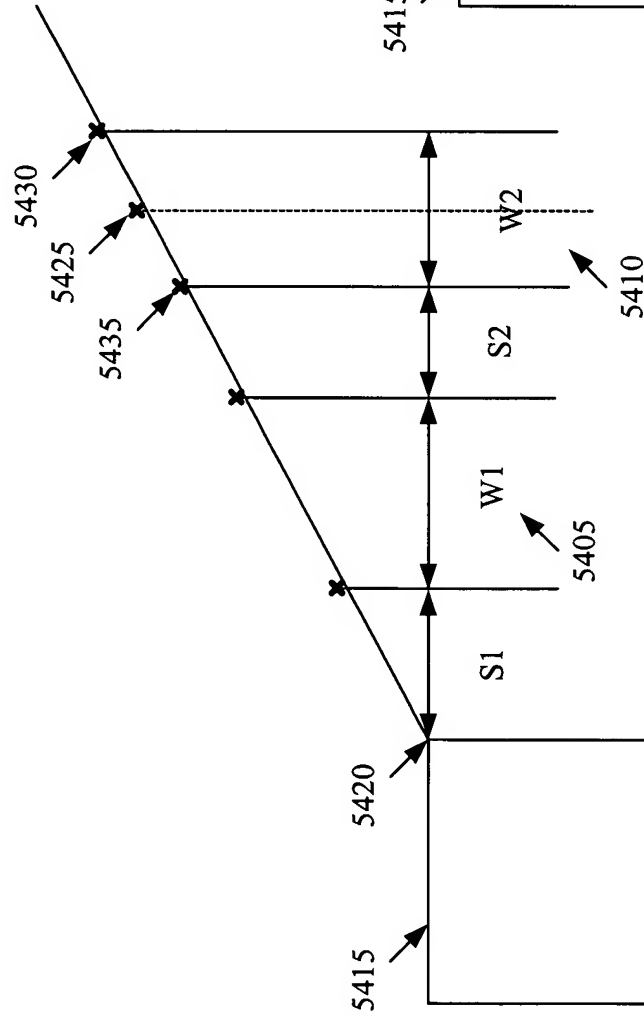


Figure 54

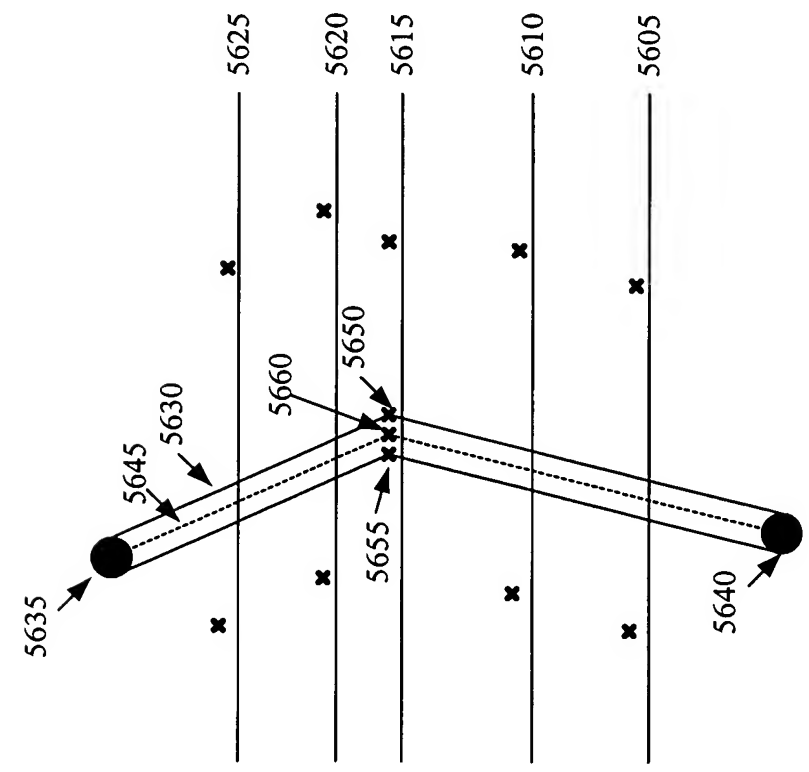


Figure 56

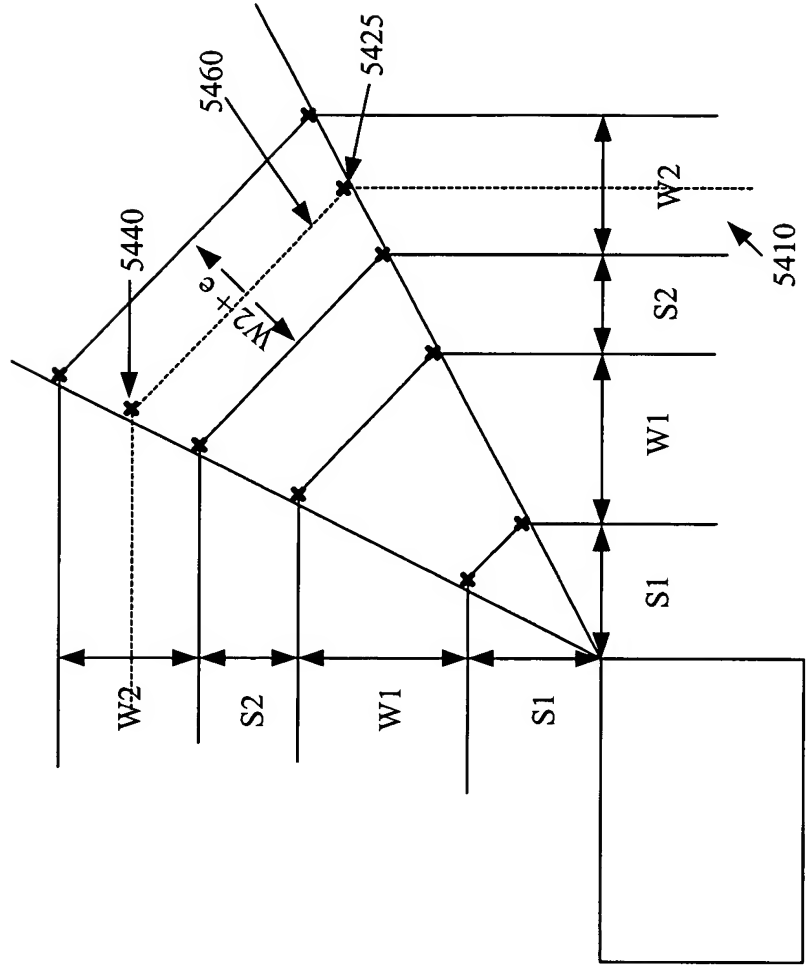


Figure 57

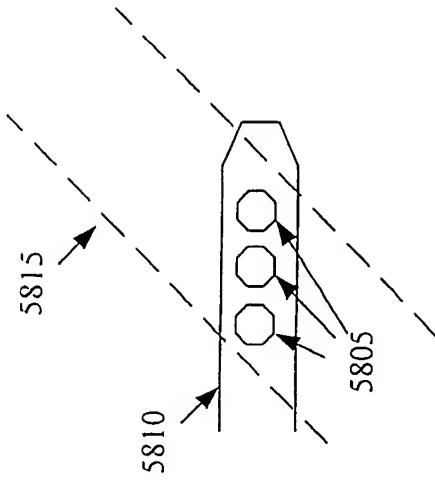


Figure 58

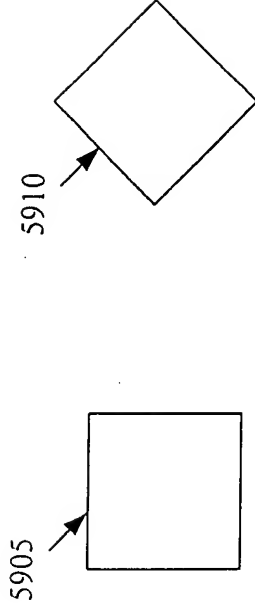


Figure 59

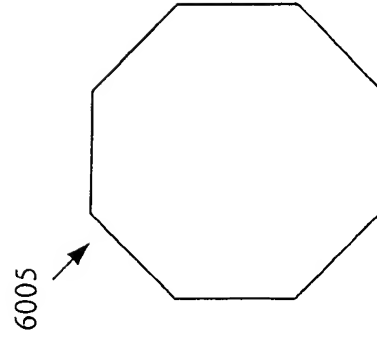


Figure 60

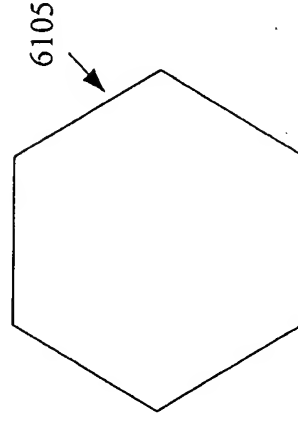


Figure 61

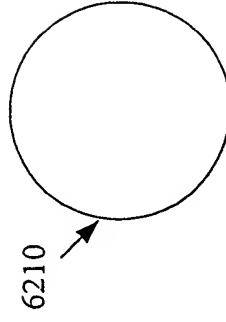


Figure 62

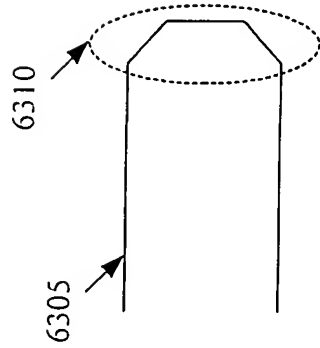


Figure 63

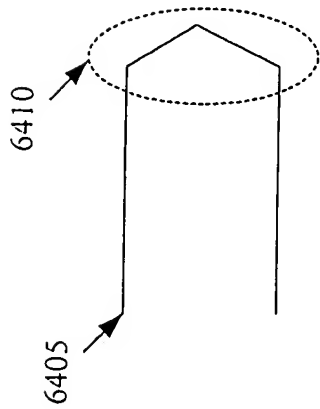


Figure 64

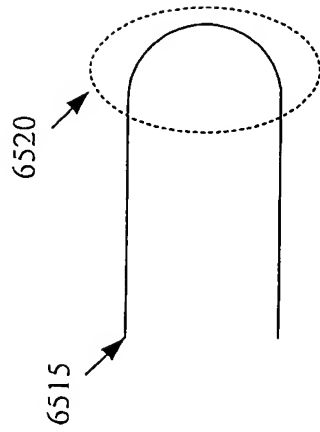
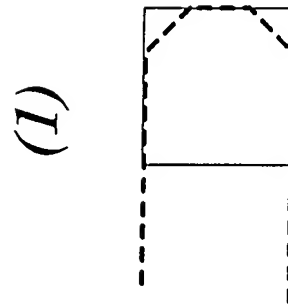
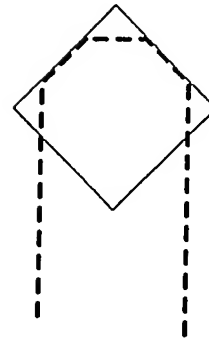


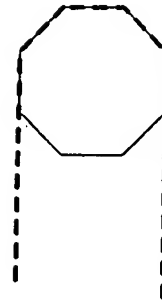
Figure 65



(1)



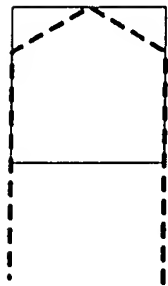
(2)



(3)

Figure 66

(1)



(2)

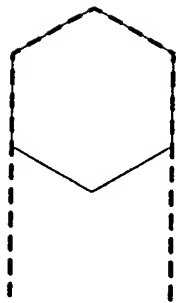


Figure 67

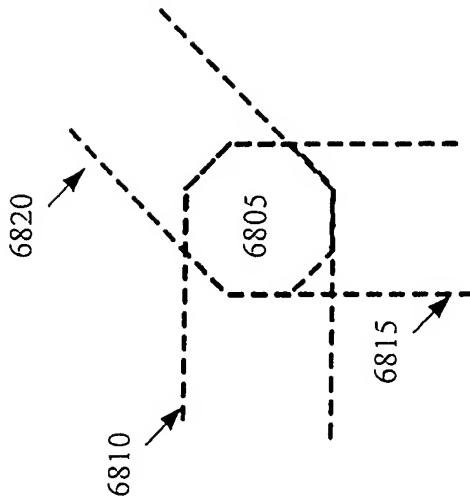


Figure 68

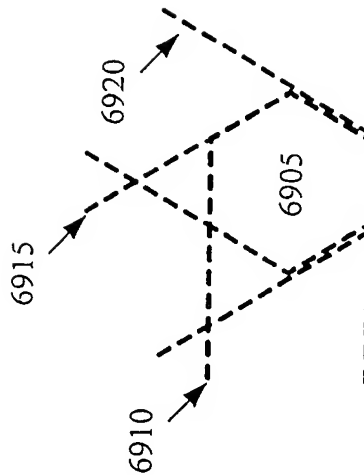


Figure 69

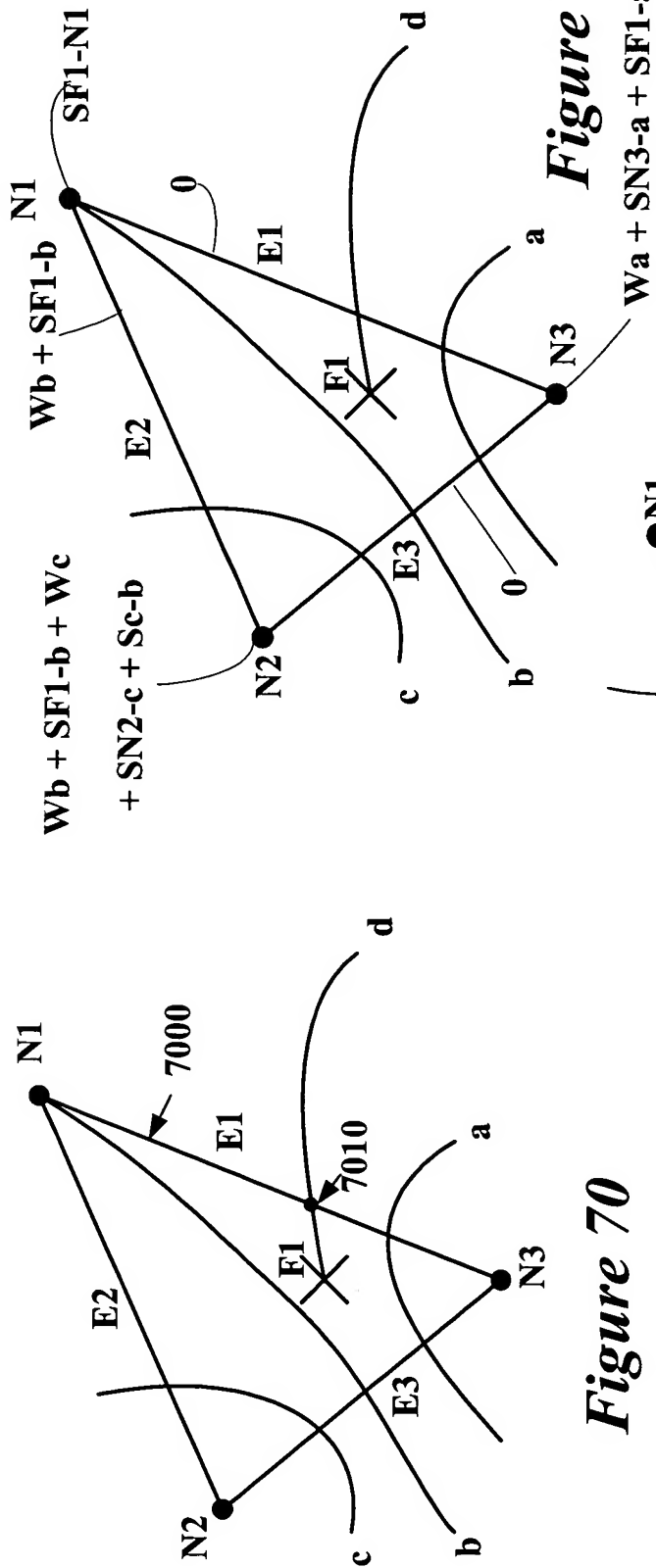


Figure 70

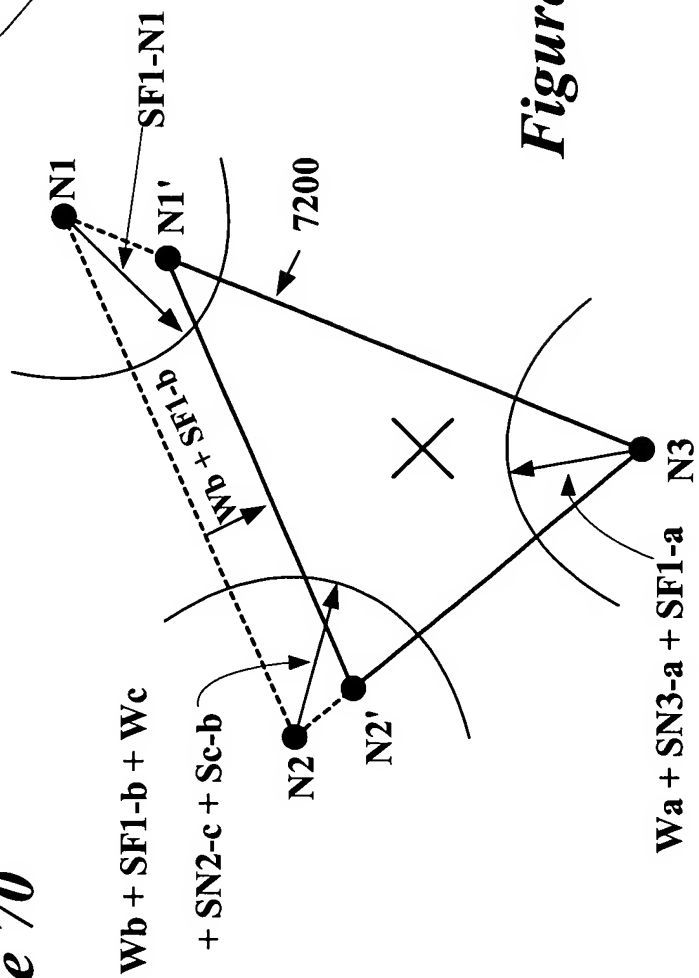


Figure 71

Figure 72

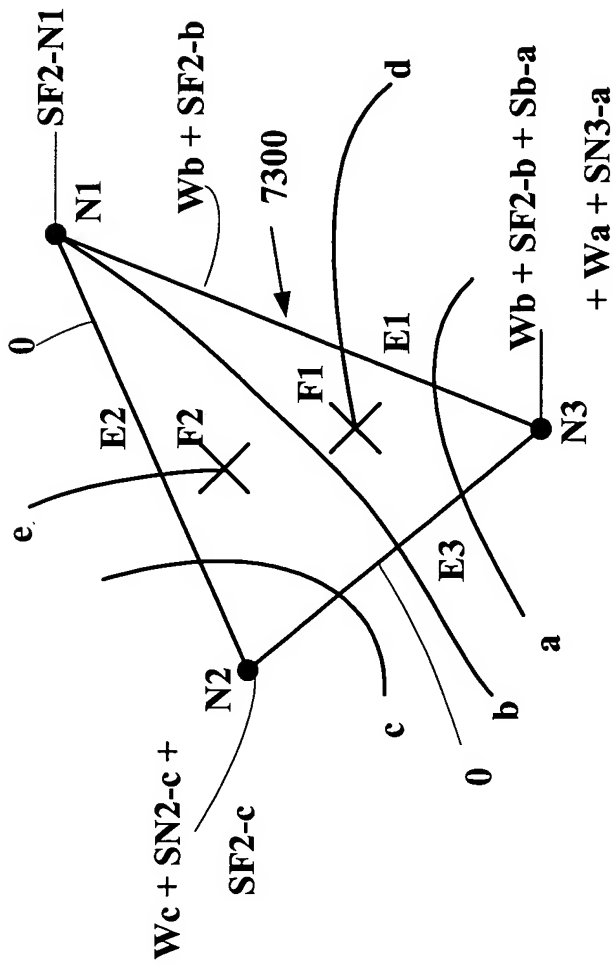


Figure 73

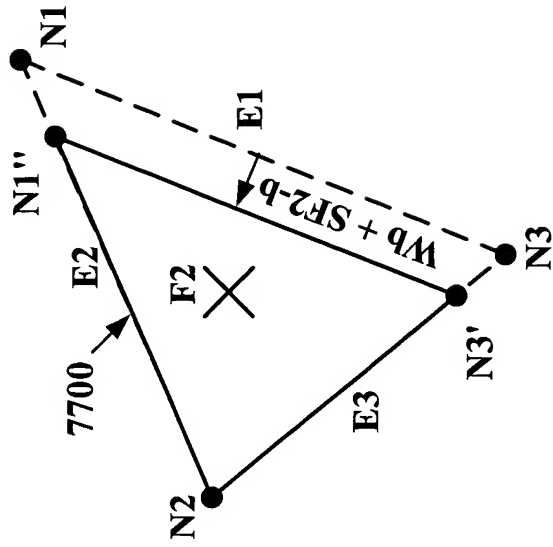


Figure 77

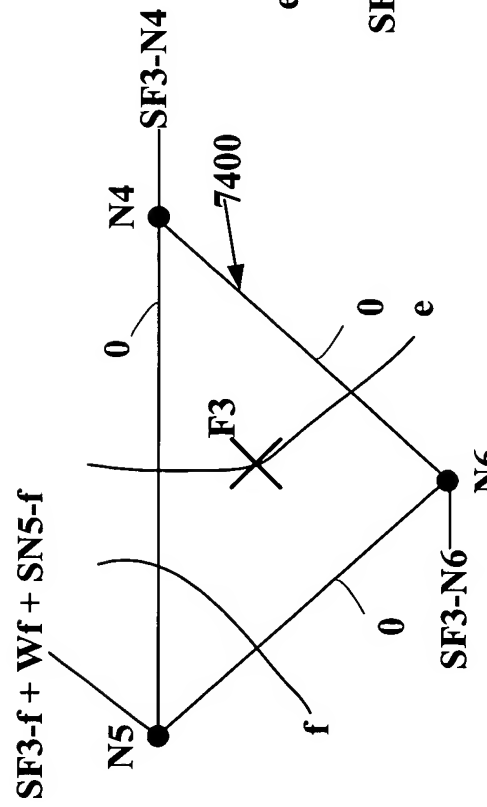


Figure 74

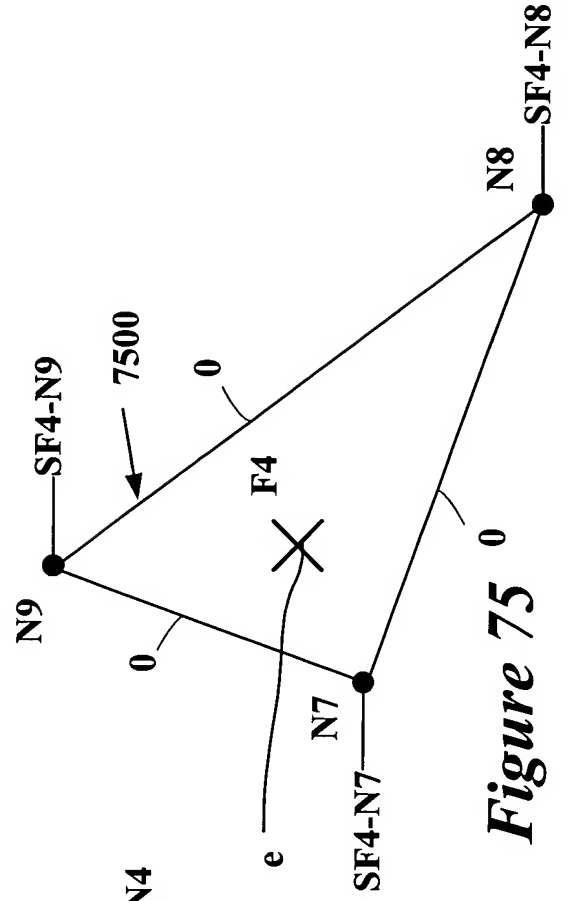


Figure 75

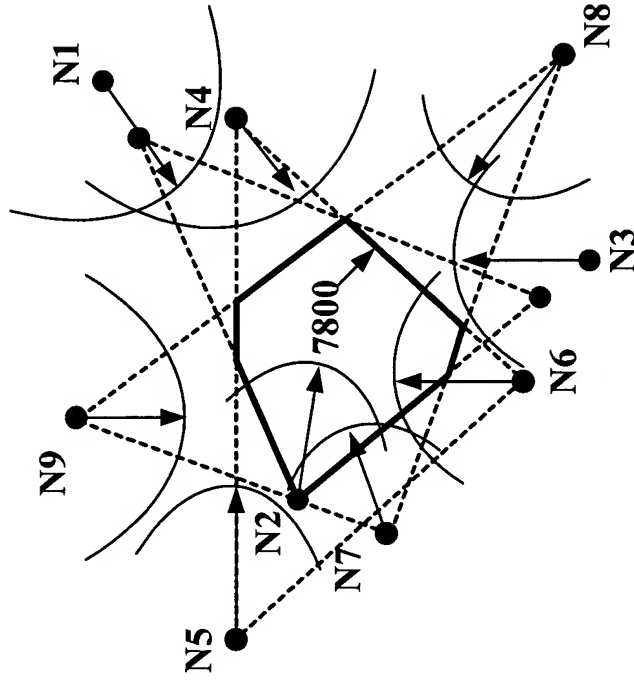


Figure 78

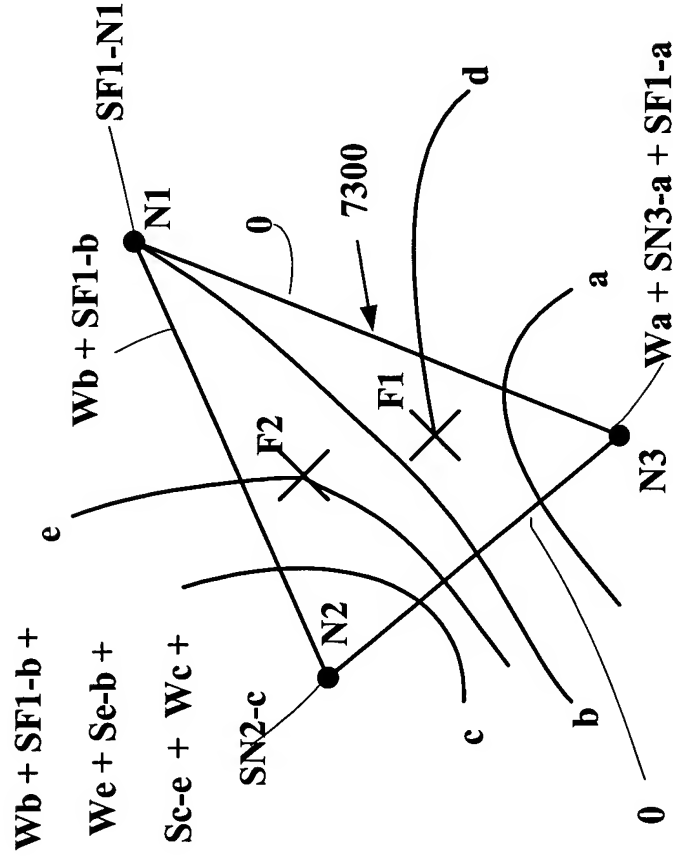


Figure 76

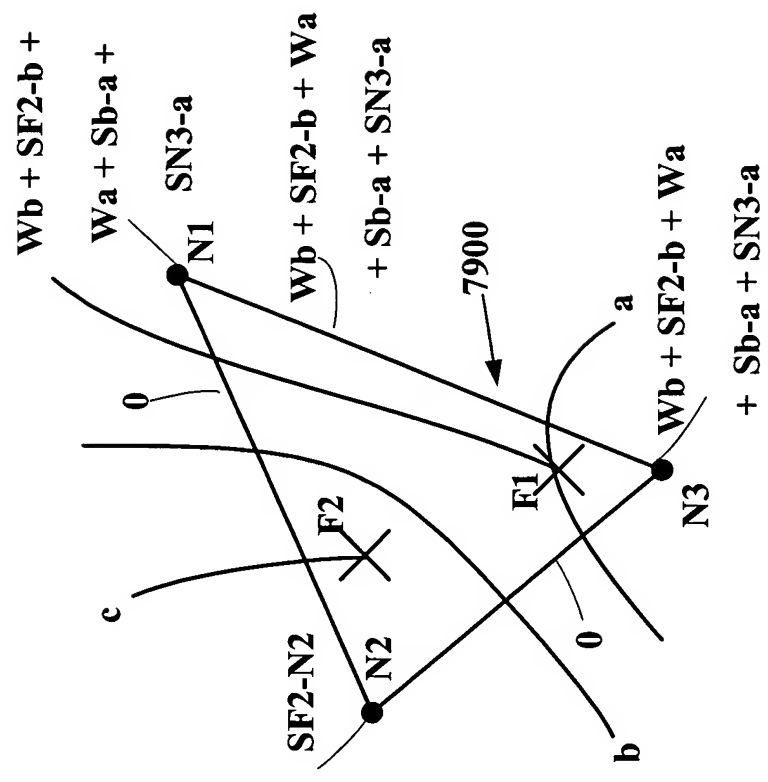


Figure 80

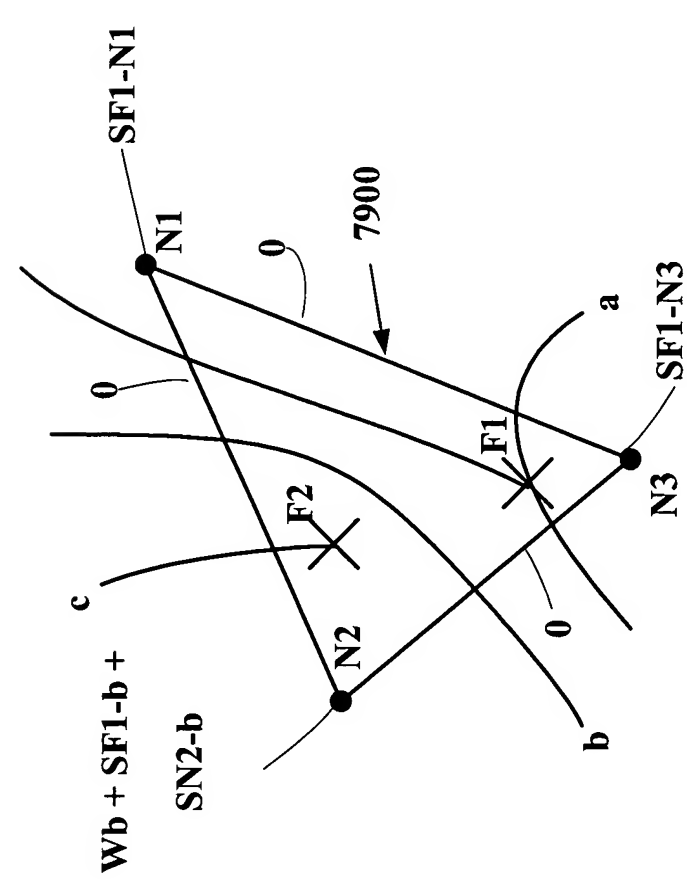


Figure 79

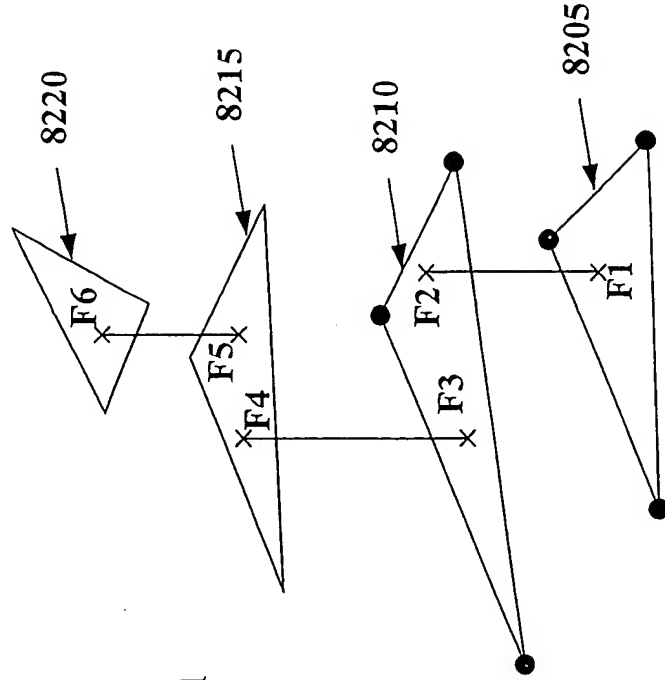


Figure 82

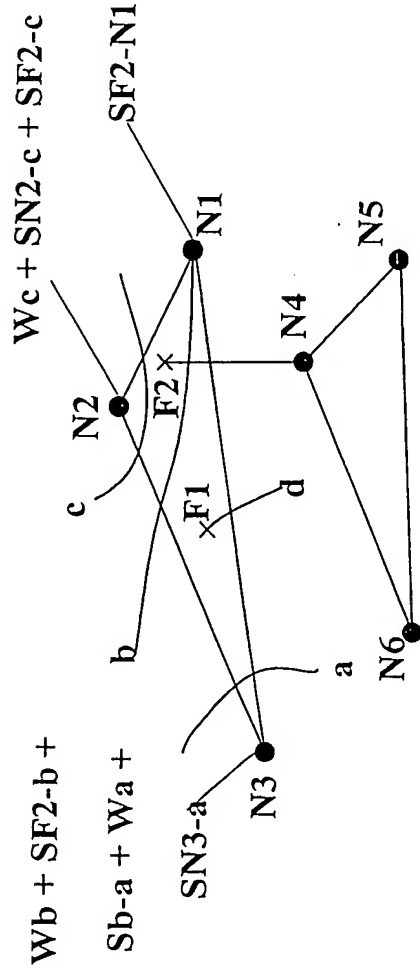
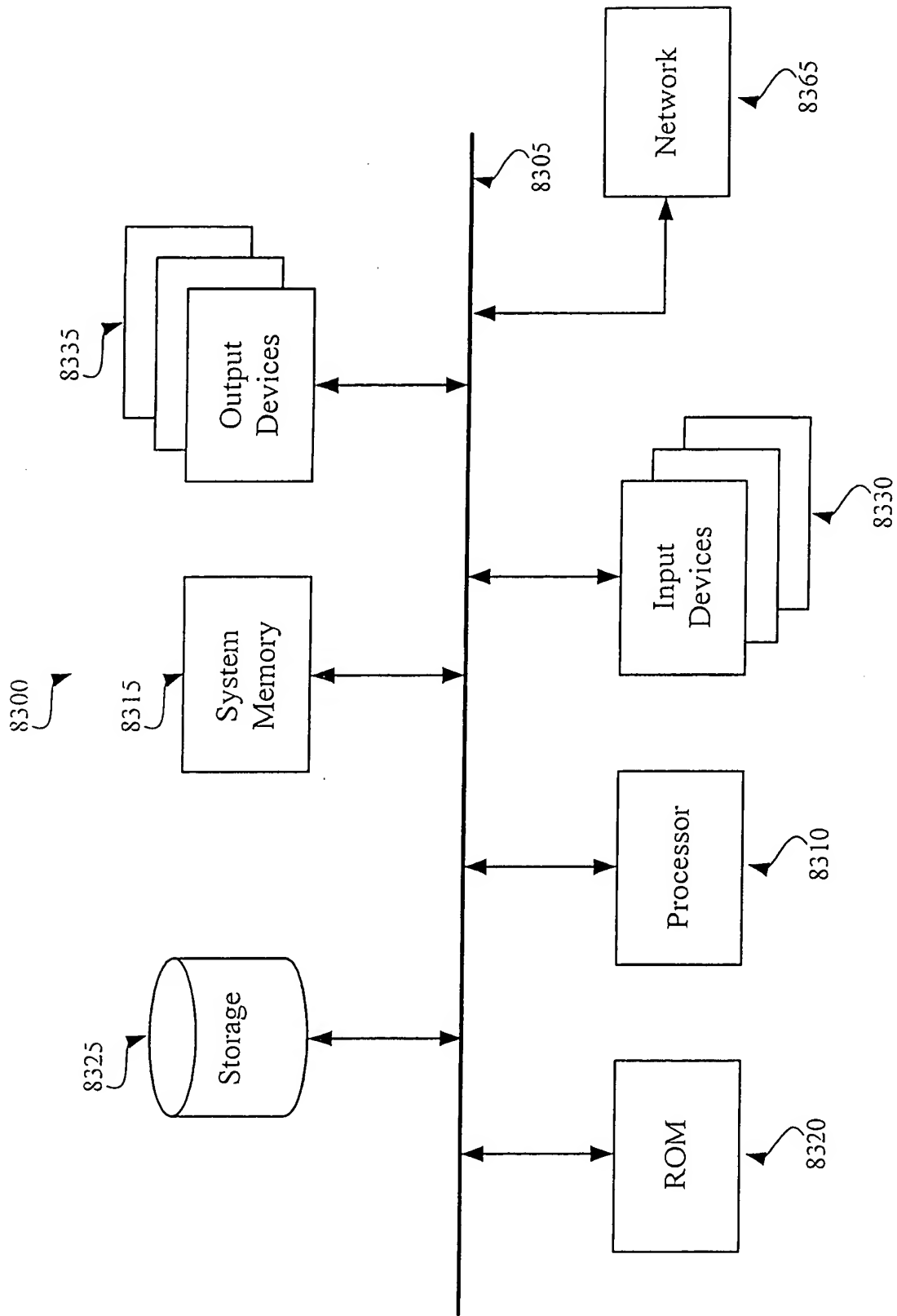


Figure 81

*Figure 83*